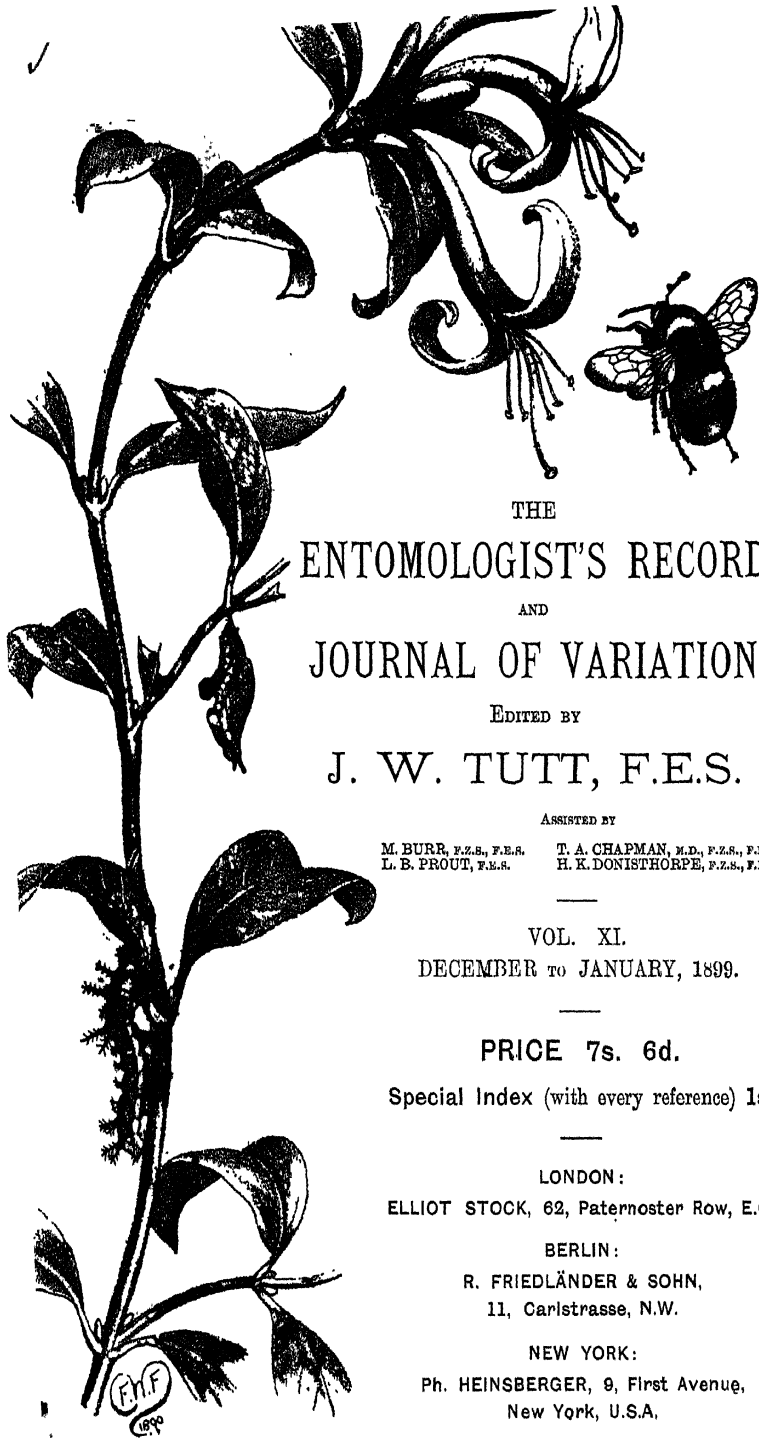




AGRICULTURAL RESEARCH INSTITUTE

PUSA



THE
ENTOMOLOGIST'S RECORD
AND
JOURNAL OF VARIATION

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PREFACE TO VOL. XI.

WE wish, on the completion of our eleventh volume, to again tender our heartiest thanks to all those who have, in any way, aided us in its production. Our thanks are, however, more particularly due to Messrs. M. Burr, H. K. Donisthorpe, L. B. Prout and Dr. Chapman, for the kind aid they have given us in the editorial department, and to Mr. G. B. Routledge for the preparation, for the sixth year, of the Special Index.

In spite of the permanent increase in the size of the magazine, we have still some difficulty in finding the necessary space to publish all useful articles as soon as accepted. This is particularly the case with the longer communications, which, however, are all dealt with in turn.

We are more particularly in need of contributors who will send us up-to-date "Current Notes," and systematic series of "Practical Hints." We should sometimes like more short "field notes" and "observations" and we would impress upon field-naturalists that it is often apparently unimportant observations of habits and life-histories that have great scientific value.

We do not propose to make any change in the character or arrangement of the forthcoming volume. Mr. Donisthorpe will have charge of the Coleoptera, Mr. Burr of the Orthoptera, whilst we shall, as for many years past, have the help of Dr. Chapman and Mr. Prout in matters pertaining to Lepidoptera.

We understand from Mr. Page, who still gives his services in the management of the business part of the magazine, that the number of subscribers is now higher than at any time since he has had charge of it. We are still open to exchange against the *Transactions* of any really good foreign entomological society with whom an exchange has not yet been effected.



The Entomologist's Record

AND

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Vol. XI. No. 1.

JANUARY 15TH, 1899.

Butterfly hunting in Dalmatia, Montenegro, Bosnia, and Hercegovina.

By MRS. M. DE LA B. NICHOLL.

I arrived at Fiume April 25th, 1898, with Mr. E. Witty. We immediately resolved to cross the harbour to Abbazia, as the mountains behind it looked rather more fertile than the barren rocks around the town. We found, however, little to keep us at this (so-called) Austrian Cannes. The vegetation approaches more nearly to that of South Devon than to that of the Riviera, and it was evidently too early in the season to do any good with butterflies at Abbazia. We therefore took boat for Ragusa, some 200 miles down the Adriatic, and landed there April 27th. We spent April 28th very pleasantly at Val d'Ombra, up a well-sheltered estuary, about five miles from the town, finding the vegetation much the same as that of the Italian Riviera. This is a good "butterfly corner," and as our list of captures may be taken as typical of what may generally be taken along this coast in April and May, I give it in full; *Papilio machaon*, *P. podalirius*, *Thais polyxena*, *Pieris ergane* (very common), *P. brassicae*, *P. rapae*, *Colias eclusa*, *Leucophasia sinapis*, *Anthocharis belia*, *Cupido minima*, *Polymnatus icarus*, *P. melon*, *P. bellargus*, *P. orion*, *Nomiades cyllarus*, *Cyaniris argioides*, *Polygonia egea*, *Pyrameis cardui*, *Pararge megera*, *P. egeria*, *Nisoniades tages* and var. *unicolor*. The most remarkable insect we saw was *Macroglossa croatica*, a splendid creature. We did not catch it on this occasion, but later on we secured two specimens, both hybernated. It is scarce in spring, but plentiful in August. It haunts the hot rock faces, hovering along the broiling masses of limestone exactly in the same manner as *M. stellularum* does along an English brick wall. April 29th we paid a visit to an entomologist who lives at Malfi, and advertises local insects and living pupæ in the *Insekten Börse*, but we entirely failed in getting any correct information from him. In fact, we were completely misinformed as to the place and date of appearance of the scarce *Erebia afer* var. *dalmata*, which we were told was common "in Bosnia in June," whereas it is, to the best of my belief, to be had only in the neighbourhood of Sebenico (Dalmatia) at the end of April and in early May. Had we been aware of this fact, we could probably

have taken it on this excursion, as we were within an easy day's journey from Sebenico. It is certainly never caught in Bosnia or Hercegovina, and is one of the two early *Erebias*—*afer* var. *dalmata* and *epistygne* being the only European representatives of the family that appear in the spring.

The first days of May we spent on the shores of the Bocche di Cattaro, and, in addition to our Ragusa list of butterflies, we took *Syrichthus orbifer* and *S. sidae*, both rare insects in western Europe, but rather common in the south-east. We took them in many places. We also caught a fine example of *Colias edusa* var. *helice*, and *A. belia* var. *simplicia* (plentiful). May 5th, we arrived at Cetinje, probably the most singular of European capitals—a village of 1,200 inhabitants, situated in a small fertile plain, surrounded by the most barren limestone mountains it is possible to conceive. Here we found a good hotel, which we used as headquarters for nearly three weeks, making tours thence to Scutari, in Albania, Rjeka, and Podgorica, in the Morača Valley. This district is a very singular one, and entomologically interesting, because the insects of the South Balkans are occasionally taken here. We got four specimens of *Chrysophanus ottomanus*, probably its extreme north-western limit—three males and one female—close to Cetinje; also two specimens of *Papilio alexanor*, *Melitaea athalia* ab. *corpalia*, a good many *S. orbifer* and *S. sidae*, and plenty of *P. ergane*, of which latter several specimens were much more darkly tinged with grey and yellow than those which we caught on the coast. We also took numbers of *Thais polyxena* on the stony mountains round Cetinje, which seems an extraordinary locality for an insect which usually haunts marshy ground. The fine variety, *ochracea*, flies with the type over these barren rocks. We got ten specimens in all, of which the ground colour was a deep yellow ochre.

On May 25th we returned to Ragusa, and spent another day at Val d'Ombla, where we got 14 good specimens of *Hesperia nostradamus*, one *P. megaris*, approaching var. *lyssa*, and *Macroglossa croatica*. We visited the beautiful Isola Lacroma, but saw nothing very remarkable, except one *Charaxes jasius*. The monks at the monastery told us that this butterfly is very common there, but not till about June 8th. This is probably in consequence of the lower temperature of the eastern Mediterranean as compared with the western, May 20th, or even earlier, being the date for *C. jasius* in Corsica. On May 28th we went to Spalato, hoping to get *Melanargia larissa* there. But we were too early for it, and only took four specimens just out of chrysalis. Besides these we caught *Polyommatus iolas*, *H. nostradamus*, and a few other common southern insects—also *Macroglossa croatica*. The country around Spalato would be better for insects if the fertility of the soil had not encouraged the cultivation of the vine to such an extent that every foot of land is devoted to grapes, which are perpetually dusted with arsenic, in order to destroy the Phylloxera, and other insects share the same fate. We travelled direct from Spalato to Sarajevo, the capital of Bosnia, situated in a rich plain, about seven miles across, and 1,500ft. above the sea. It has probably been, in prehistoric days, the bed of a lake. This plain is surrounded by fine mountains, varying in height from 4,000ft. to 6,400ft., very well wooded and picturesque, a great contrast to the barren "Karst" of Montenegro and Dalmatia. Sarajevo

possesses a good museum, and we inspected the various collections with great interest, especially the entomological department, ably presided over by Dr. Apfelbeck, who gave us every facility for obtaining local information; but we were somewhat disappointed to find that few of the butterflies of south-eastern Europe are to be taken in Austrian Turkey, the insects of Bosnia being generally those of the eastern Alps, whilst the Hercegovina produces most of the Dalmatian species, and, so far as we could discover—nothing else.

We resolved to turn southwards again, and try what we could find in the hot limestone gorges of the Hercegovina, so we went to Jablanica, June 7th. This is a summer resort, beautifully situated on the Narenta, in a deep valley, which has here cut a great trench between the precipices of the Prenj on the east and the Drinaga on the west. It is a good butterfly corner, there is considerable variety of geological formation in the immediate neighbourhood, and several well-wooded side valleys, with occasional hayfields. The railway banks (in the main valley) present a delightful tangle of fragrant weeds and bushes, easily worked from the high road, which runs close along side the line. We had two good days here, the finest of which we devoted to the ascent of the Drinaga (6,650ft.), six hours of rather rough walking from our hotel. It was, however, too early for the mountain butterflies, and we saw nothing on the higher levels excepting *Brenthis euphrosyne* and a few *P. ergane*. This latter surprised us, as we did not expect to find it 5,000ft. above the sea. In a steep meadow, half way up, we found *Melitaea aurinia* (type), *Nonialis semiargus*, *C. minina*, *S. alveus*, and many common things, and in a clearing in the beech forest *Neptis lucilla* abounded, evidently just out of chrysalis. Our second day was spent on the railway banks, up the Narenta Valley, and here we took *Chrysophanus alciphron* in plenty, one fine specimen of *Thecla w-album*, *Argynnis daphne*, *A. adippe* var. *cleodora*, *Dryas paphia*, and many others. This is the first time I have taken *C. alciphron*, of which *C. gordius* is frequently given as a variety. The two insects are extremely alike, but their habits and manner of flight differ so widely that I feel no doubt of their being distinct species. *C. alciphron* is common all through Bosnia and in the wooded districts of Hercegovina; it haunts bushy places, and is rather a sluggish insect, perching lazily on many kinds of sweet flowers—whereas *C. gordius* likes stony places, flies fast, and is by no means greedy. I never saw *C. gordius* once during last summer's tour.

June 11th found us at Mostar, one of the hottest nooks in Hercegovina, of which it is the capital. It stands only 150ft. above the sea, on the rapid Narenta, well sheltered from the north and east by the great mass of the Velez Planina (limestone, 6,000ft. high). We drove out to Blagaj, about eight miles east of Mostar, where the Buda issues, a full-grown river, from a great limestone precipice. The place is a perfect suntrap, the rocks all overgrown with pomegranate, clematis, and the various other shrubs which clothe the Mediterranean coasts. Here again we found good collecting ground, on which we spent two days. We took *M. larissa* var. *hertha* in abundance, *Thymelicus actacon*, *S. sidae*, *S. orbifer*, *P. ergane*, *T. arachis*, *T. spin*, *Polyommatus escheri*, *P. iolas*, *Dryas pandora*, *A. daphne*, *Melitaea phoebe*, *M. didyma*, *L. sinapis* var. *diniensis*, &c. There is also excellent

ground on the western side of Mostar, where we got a single specimen of *Polyommatus balcanica*, fresh from the chrysalis. But our utmost endeavours failed to discover any more of this lovely little blue, so we went back to Sarajevo, intending to return later on to look for it.

June 15th saw us back at Sarajevo. On the 16th we explored a gully running up to the Trebevic, a beautiful and well-wooded mountain, 5,000 feet high, close to the town. Here we found a great many insects—*Parnassius mnemosyne*, *Chrysophanus hippothoë* (very dark specimens), *Brenthis amathusia*, all the common Melitæas, *Polyommatus eros*, *Coenonympha arcania*, *C. iphis*, &c. But we were anxious to lose no time in trying the marshes of the Save for *Chrysophanus dispar* var. *rutilus*, and also the wooded valleys of north Bosnia for the rare *Neptis aceris*, so we travelled by night train to Bosnisch Brod, and arrived there in torrents of rain, at 2.40 a.m., on the 17th. It poured all that day, much to our disgust, for we were already late for *N. aceris* and *C. dispar*, and we feared that the bad weather would spoil our chances of good specimens. And so, indeed, it proved, for when June 18th brought sunshine and we took a great many of the splendid "Great Copper" around the glacis of the fortress of Slavisch Brod, and in the marshes, few indeed of them were perfect insects.

Still, June 18th was a red letter day with us; we had neither of us ever seen such a "copper" before, and although *C. dispar* var. *rutilus* is not as big as the extinct English type, yet it is a lovely butterfly! It darts like a living flame along the tall greyish marsh grass, then, suddenly turning the grey underside of its wings towards you, it becomes almost impossible to mark its flight, till, with another turn, the fiery copper again flashes in the sunshine, and tempts the reckless pursuer to flounder deeper and yet deeper into the bog! I think, on the whole, that this butterfly is easier to catch on a grey warm day, without much sun. It may then be seen sitting with closed wings on blades of grass, or on yellow flowers, and may be quietly approached and netted without difficulty. It is to be had pretty nearly all through the summer at various dates, according to the elevation, in every wet valley of north Bosnia, up to a height of about 2,000ft. (or more); and the second brood appears in the lowlands almost before the first brood is over in the hill country. Those taken in the mountains are a great deal smaller than the first brood in the Save marshes. On this 18th of June we took, besides the "copper" *Everes argioides* in plenty, *T. acaciae*, *Araschnia levana*, and a splendid specimen of *Apatura ilia* var. *clytie*. We devoted another day to the marshes, and got some more *C. dispar* var. *rutilus*, several bad specimens of *Coenonympha darus* and *M. galathea*, and some sundries, but entirely failed to find *N. aceris*. As usual, we had no exact information as to where to get it, and it was only because the steep, wooded hills of Kobas looked picturesque, rising abruptly from the plain of the Save, about 20 miles off, that we resolved to explore them. We started at 4.0 a.m. by train, and many and absurd were our adventures before we reached our point, but 11.0 o'clock found us ascending a wooded glen at the foot of the Kobas; and here, on a Spanish chestnut tree, we saw three *N. aceris*. We took them all, but only two of them were tolerable specimens, and we were evidently late for the butterfly. However, we were enchanted with our prize, and hoped to get plenty more before the day was over. But, alas! grey

clouds began to drift across the sun. In vain we waited; the weather got worse, and at last the rain came down in torrents and drove us to shelter in the neighbouring village.

We then resolved to start next day for some of the higher forest districts of north Bosnia—Travnik and Jajce—in hopes of finding *N. aceris* in better order, but we never pitched upon the species again, and it remains among “butterflies wanted” for the collection. Leaving the Save valley, we next visited Travnik, an interesting little town, wedged up against the bare limestone precipices of the Vlasic Planina, 6,000ft. high. It is a very hot place, and the lower hills to the south of the town being of some kind of sandstone formation, well wooded, and rather boggy, it should be a good place for butterflies. *Apatura ilia* var. *clytie* is very abundant in the town itself; we took several good specimens in the streets. On June 22nd we went up a very steep dry gully in the cliffs close to the town, and found *Neptis lucilla* plentiful in the brushwood that clothed the rocks. Near the top *Parnassius apollo* occurred—Swiss type. After a hot scramble we reached a plateau, about 4,500ft. in height, and there found good mountain meadows and much brushwood. We got *Brenthis hecate* here, *Polyommatus eumedon* (type and var. *fylgia*), *Lycaena arion*, *N. semiargus*, *P. iolas*, *P. amandus*, *C. iphis*, and many other common things, but nothing unusual, and no *Erebia*s except *medusa*. A threatening thunderstorm drove us down about midday, but it never came to Travnik, and we spent the afternoon collecting in some nice wet fields on the sandstone hill immediately south of the town. Here we took quite a different class of insect, especially Fritillaries, which swarmed; but again no captures of any note. June 23rd we devoted to the ascent of the Vlasic, a great, grass-covered, limestone plateau, about eight miles or more in length from east to west, defended all along the southern face by tremendous precipices. We made a wide *détour*, and ascended the western end of the ridge; then walked all along the grassy northern slopes to the top, which is nearly due north of Travnik. We took great quantities of *E. medusa* var. *psodea* on this mountain, and a few specimens of *E. oeme* var. *spodea*, both quite fresh, but no *Melampias epiphron*, which rather surprised me. Returning to Travnik by a steeper and more direct route, we took numbers of *P. mnemosyne*, *P. eumedon* var. *fylgia*, *B. hecate*, &c., but no insects occurred till we had descended nearly 1,000ft. from the summit. These eastern mountains are singularly cold and late; insect life did not appear to have ascended much over 5,000ft. even at the end of June. I was lucky enough to get a good specimen of *Aglaia urticae* ab. *turcica* at the highest shepherd huts on the Vlasic. The type swarmed there, and we caught a great many, but found only one *turcica*. June 25th found us at Jajce, on the Pliva, a good place for insects, with considerable variety of geological formation. The town itself is built on a curious kind of sandstone rock, through which the lovely river cuts its way in great rapids, ending with a fine fall. All the higher ground is mountain limestone. I never, in all Bosnia, met with any elevation over 4,000ft. of any other formation, though the rocks of the lower hills and valleys vary considerably. We took a good many species of butterflies during our week at Jajce, of which the most remarkable were: *Apatura iris*, *A. ilia* var. *clytie*, *Thecla acaciae*, *Everes telicanus*, *P. iolas*, *L. arion*, *C. dispar* var. *rutilus*

(found in mountain meadows), *M. maturna*, *C. darus* (remarkably large in the specimens in the marshes by Jezero Lake), *F. ligea*, *Cyclopterus* sp. etc. Returning to Sarajevo on June 30th, we again tried the Trebevic, with much success. In the woods on the lower slopes, *C. morphus* swarmed, and *C. aliphron*, *C. hippothoe*, and *C. virgaurea* were common. Higher up we took *Limenitis populi*, *P. eumedon* var. *typha*, *C. iphis* and *C. darus*, curiously approximating in colour and marking, and flying together. *E. oeme* (type and var. *spodea*), *E. tyndarus* var. *balcanica*, and the splendid *Colias myrmidone*, flying in profusion near the top, with an occasional specimen of the white ab. *alba*, which was decidedly a prize. We arranged to spend a night at the little Tomispenhart, just under the summit of Trebevic, and on July 2nd we took a good series of this handsome variety, which appeared to haunt the white stones lying amongst the grass near the top of the mountain. We also took on this day many specimens of *P. amandus*, also *E. oeme*, about half-way down. We then went back again to Mostar, where bad weather compelled us to spend two idle days. The thunderstorms were extraordinary, and our hotel was struck by lightning. July 8th was fine, and we drove out to the Radopolske Grad, about four miles west of the town—it is a pretty dingle in the limestone rocks, very hot, with a small river rushing ready made out of a cavern. Here we took plenty of *Melanargia larissa* var. *hertha*, five or six *P. balcanica*, two *C. thersamon* var. *omphale*, and a few sundries, such as *Lilyphe celtis*, *P. iolas*, &c. Next day we started for Nevesinje, taking Blagaj on our way; here we spent most of the day collecting, but not with the same success as on previous occasions. We took three *P. balcanica*, two *C. thersamon* var. *omphale*, and some good examples of the black aberration (*eleus*) of *C. phlaeas*. These are much darker than my Spanish specimens. From Blagaj to Nevesinje we crossed a wide limestone plateau—a spur of the Velez Planina. I observed plenty of *M. larissa* all the way across the plateau, but as we descended the northern slope it disappeared, nor did we ever meet with it again in the country beyond Nevesinje.

Next day we drove on to Gačko, close to the frontier of Montenegro, and on July 11th we started for the Baba Planina, a mountain (limestone, of course) about 16 miles south-east of the town, 6,000ft. high, and very near the boundary. The high, marshy plain of Gačko is uninteresting, but after crossing this we struck into pretty defiles running up the sides of the Baba, well wooded, fertile, and excellent ground for collecting. *F. ligea* and *F. aethiops* swarmed in the brushwood; *P. iolas*, *P. amandus*, and *P. corydon* (just out), covered every damp place in the path; *C. morphus* was common; and when we reached a height of about 4,000ft., *Colias myrmidone* was abundant in the hayfields, with an occasional ab. *alba*. *P. apollo* swarmed, but presented no variations; *M. maturna* occurred in open places in the woods, and we took two or three *C. thersamon* var. *omphale* on wild mint. Our road presently led us through a beech forest, such as cannot be found in civilised parts of Europe, for here the hand of man has scarcely touched the wood; the giant trees have grown up, decayed, and fallen down, as nature willed them to do; and the wolf and the bear still haunt their wild solitudes. But here the shade was too thick for butterflies, and when at last we got out of the forest, we found the higher mountain pastures so closely grazed

that very few insects were to be had. But on a rocky ridge which sloped up to the highest point of the mountain, I got *P. eros*, in poor condition; and then, as we were descending this same steep ridge, I marked a fine black *Erebia* rising wildly from the stones. After an arduous chase I netted it, and rejoiced greatly to find that it was *Erebia melas*, just hatched, and remarkably early. We did not take the insect in any number till a week later. We slept in the forester's hut, after supping off a sheep, roasted whole on a long stick. We had intended to return next day to Gačko over the Bislavnica, a mountain about the same height as the Baba Planina and running parallel to it, but bad weather drove us straight down to the hotel, and we started next day on an excursion along the Austrian and Montenegrin boundary, a wild and most beautiful district, stretching for a distance of about 45 miles in a direct line from Gačko to Foča, on the Drina, near the Servian frontier. It is a forest country, and in many places the forest is still as nature made it; such trees I have never seen anywhere else. Villages there are none, nor any houses, except the frontier posts of the Austrian constabulary. The actual boundary line runs along the summits of a group of fine mountains, 8,000ft. high, of which Maglij and Vlasuljak are the highest and most remarkable. Both of these we ascended, and took *E. melas* in abundance on the southern slopes of both, but we were rather early for it (July 17th and 19th), and consequently we got very few females. *E. melas* is a wary insect, but not nearly as wild and hard to catch as the *Erebia* which I took at Campiglio and supposed to be *E. melas* (which it greatly resembles). We found *E. melas* to be exceedingly variable; sometimes there were eyes on the hind-wings, sometimes none. We also took two specimens with the eyes on the fore-wings very small and inconspicuous, and placed on a small brown blotch. They haunted the high slopes of rolling stones, and always preferred certain special spots, by waiting at which it was easy to secure a good number. Mr. Witty took six, without rising from his seat on a big stone which was close to one of their favourite beats, up and down a stone slope. It is lost labour to run after them, as the clatter of your feet on the loose stones frightens them entirely away from the slope. The *E. melas* of the frontier mountains were larger than those which we afterwards got on the Prenj, some 60 miles further west (and probably the western limit of the eastern *melas*). Besides *E. melas*, we took on these frontier mountains: *E. pronöë*, *E. gorge* (type), *E. euryale*, *E. tyndarus*, and *Melampias cassiope*. Of *E. tyndarus* we took the type, freshly hatched, in plenty near the summit of Maglij, and var. *balcanica*, very well marked, about 1,000ft. lower down, the difference between the two being remarkable as occurring within an hour's walk of one another. *B. arthius* was common in the valleys; *Brenthis pales* near the top of Vlasuljak, and we took a few common mountain insects; but, on the whole, we were rather disappointed with the butterflies of these beautiful mountains. In the valley of the Drina we took *A. iris*, *A. illa*, and *Enodia dryas*, as well as most of the common insects of the eastern Alps. "Blues" were remarkably scarce, and the season was now too late for most of the Argynnids and Meliteas, but I saw *B. amathusia* and *M. maturna*. Probably the climate is too severe for the southern and eastern Satyrids. I failed to get any specimens of *Syrichthys andromeda*, which is to be had

here. Returning to Sarajevo, we made another excursion up Trebevic on July 24th. We saw many butterflies, but nothing new excepting *E. manto* (type). July 25th we tried Igman, a wooded mountain 4,000ft. high, behind Illidze, and took a variety of common "Blues," *L. sibylla* and *T. r-album* (2). We then went south to Konjica, and made an interesting excursion into the Prenj mountains, up the Narenta, and across the Prenj *via* Ruiste to Mostar, but we took no butterflies of interest except *E. melas*. When we came down into the hot valley by Mostar, we again took *M. larissa* var. *hertha*, though it was quite the end of July, and the Mostar country was too much burnt up for insects. A day at Blagaj produced very little, *M. didyma* var. *neera*, *Satyrus statilius* var. *allonia*, and *E. dryas* being our best catches. So I went back to Sarajevo, on my way home, and captured several nice specimens of *C. thersamon* and *C. dispar* var. *rutilus*, close to the town. They were in good order, second brood, and the *C. dispar* not more than half as large as the ones we took in the Save valley. So ended an interesting tour in a beautiful and little-known corner of Europe. Sarajevo is 26 hours from Vienna by rail.

The systematic position of *Pseudopontia*. *

By PROFESSOR ENZIO REUTER, Ph.D., F.E.S.

In *The Entomologist's Record*, vol. x., nos. 2-4, I published an article on a "New Classification of the Rhopalocera," giving a brief summary of the principal phylogenetic results arrived at in my book *On the Palpi of the Rhopalocera*.¹ In no. 7, pp. 180-181, of the same magazine Mr. Harry Moore asks me to explain why I consider the *Pseudopontiinae* a subfamily of the *Pieridae*. He holds *Pseudopontia paradoxa*, the only known species of the genus, not to be a butterfly at all, and wishes to know whether I have been guided in my conclusions by a study of its basal-fleck alone or, as I state in my article, "taken into consideration other characters, affording a test of relationship with the Rhopalocera."

If Mr. Moore had read my book this query would have been superfluous, and there would have been no need to doubt the accuracy of my statement quoted above. He would then have found (pp. 228-230), first, that I have really taken into consideration not the palpi and the basal-fleck alone, but also other characters, among which the wing-venation and the form and structure of the antennæ have been chiefly kept in view; secondly, that it is well known to me that *Pseudopontia* is considered by some authors a moth, or that at least the fact of its being a butterfly is questioned; and thirdly, for what reasons I consider *Pseudopontia* a butterfly and the group *Pseudopontiinae*, constituted by this single genus, a subfamily of the *Pieridae*.

Pseudopontia is, indeed, a very curious genus, and much about it is abnormal. I cannot, however, find that the genus exhibits any specific Heterocerous character, or any character which contradicts its position among the butterflies. It is true that its antennæ are quite unclubbed, but among exotic butterflies are several forms, whose

* On account of certain circumstances the writing of this article has been delayed.

¹ E. Reuter, "Über die Palpen der Rhopaloceren. Ein Beitrag zur Erkenntnis der verwandtschaftlichen Beziehungen unter den Tagfaltern." Helsingfors, 1896.

antennæ lack distinct clubs; from *Pseudopontia* to many of these the gap is scarcely greater than from such an almost unclubbed form to the well-clubbed, as, for example, that represented by our Argynnis. The presence or want of a club on the antennæ is, in fact, a very relative character, and the name "Rhopalocera" for the butterflies is consequently inexact. With regard to the structure of the antennæ, *i.e.*, the structure and relative proportions of the single joints, and to the small number of these, *Pseudopontia* is unquestionably a butterfly.

Although the wing-neuration of *Pseudopontia* is a very peculiar and abnormal one, we can without difficulty refer it to the Rhopaloceran type, and it may best be compared with that represented by some Pieridids as Plötz², and Schatz³, and recently Mr. Grote⁴ have pointed out. It may be insisted upon, for example, that the pre-costal vein ("vein 1") on the secondaries, is a typically Rhopaloceran character, and Prof. Chr. Aurivillius⁵, that well-known entomologist who has especially dealt with the African Rhopalocera, remarks: "Die Präcostalrippe der Hinterflügel ist an und für sich hinreichend um der beweisen, dass wir es mit einem Tagfalter der thun haben."

We have, indeed, no ground to consider *Pseudopontia* a moth; it is a butterfly, although an aberrant one. It belongs—in spite of its unclubbed antennæ—to the same systematic group as the well-clubbed and several more or less indistinctly clubbed or almost unclubbed forms, which constitute the group called "Rhopalocera."

We may now consider the question of the position of *Pseudopontia*, in the Rhopalocera. It is evident, as I have pointed out in my book, that if this genus can be at all incorporated with any of the generally acknowledged families, there can, considering the fully developed forelegs of the *Pseudopontia*, be the question only of two families, *viz.*, the *Papilionidae* and the *Pierididae*. I have in my book given full reasons for its not being a Papilionid. *Pseudopontia* must, therefore, either be considered a representative of a separate family or be incorporated with the *Pierididae*.

At first sight, the strange wing-neuration and the peculiar form of the antennæ and the palpi seem to be in favour of the former alternative. Since, however, the pattern of the neuration of *Pseudopontia* can be very well compared with that of some true Pieridids, the former being only an extreme modification of the latter, since even other families contain forms with strongly clubbed as well as with almost unclubbed or at least very indistinctly clubbed antennæ, and the structure of the antennæ agrees with that of the Pieridids, since, further, in another family, *viz.*, the *Papilionidae*, several species are to be found with apparently two-jointed palpi—as in *Pseudopontia*—and thus this anomaly seems to be of comparatively little taxonomic value, and, finally, since the structure of the basal-fleck of the palpi most closely resembles that of some of the lower Pieridids, we shall, perhaps, do

² C. Plötz, "*Pseudopontia calabarica*, n. gen. et n. sp.," *Stett. Ent. Zeit.*, xxxi., 1870, p. 348.

³ Schatz, "Die Familien und Gattungen der Tagfalter, systematisch und analytisch bearbeitet," Fürth, 1885-1892, p. 65.

⁴ A. R. Grote, "Specializations of the Lepidopterous wing; the Pieri-Nymphalidae," *Proc. Amer. Philos. Soc.*, vol. xxxvii., 1898, pp. 40-41. *Idem*, "The Position of *Pseudopontia* (*Gonophlebia*)," *Entom. Rec.*, x., 1898, pp. 213-215.

⁵ Chr. Aurivillius, "Beiträge zur Kenntniss der Insektenfauna von Kamerun, 2, Tagfalter, 4." *Entom. Tidskr.*, Stockholm, 16, 1895, p. 257.

best in incorporating *Pseudopontia* with the *Pierididae*; the more so, as it exhibits also other characters, already pointed out by Plötz and Schatz, *e.g.*, the bifurcate claws, which agree with those of this family.

Nevertheless *Pseudopontia*, as indicated above, stands isolated among the *Pierididae*; its strange anomalies, at any rate, place it in pretty strong contrast with the other members of this family. It may, thus, be advisable and logical to consider the genus *Pseudopontia*, a representative of a separate subfamily *Pseudopontiinae* as distinct from the subfamily *Pieridinae*, containing all the other *Pierididae* (excl. the anomalous genus *Styx*, the position of which in this family seems doubtful). As *Pseudopontia*, no doubt, is a survival of an old stem, extinct long ago, the branching represented by the two subfamilies, from the common main Pierid trunk, must have taken place in a very early phylogenetic epoch.

Recently Mr. Grote in two articles (quoted *ante*) has discussed the position of *Pseudopontia*. In the former he regards this genus as "an offshoot of the Pierid stem," and states that "the neuration shows us that there is no contradiction offered to the view that *Gonophlebia* (*Pseudopontia*)⁶ is a specialised Pierid." In the latter article he would place the family constituted by *Pseudopontia* among the *Hesperiades*, "considering it as a curious and modified survival of the ancestral Pierid butterflies, and having nothing at all to do with the *Papiliones*."

For my part, I cannot find any reason for associating the genus with the *Hesperiades*, and I cannot at all agree with the view that the *Pierididae* should in any way be allied with the *Hesperiidae*, nor that the *Lycaenidae* should be connected with the latter family, as Mr. Grote considers in a third interesting essay.⁷ I am strongly of opinion that the *Hesperiidae* have "nothing at all to do" with the whole phyletic stem represented by the Rhoplocera, *i.e.*, that the *Hesperiidae* "are not butterflies at all." The same view has been quite recently maintained in the most decided manner by Prof. Karsch.⁸

As to the relationship between the *Pierididae* and *Papilionidae*, I am compelled to adhere to my former opinion. In favour of these views, I have given many arguments in my book, quoted above, to which I again would ask those interested in the matter to refer.

⁶ The name *Pseudopontia* should be retained.

⁷ Grote, "Die Schmetterlingsfauna von Hildesheim. Erster Theil: Tagfalter," Hildesheim, 1897.

⁸ F. Karsch, "Giebt es ein System der recenten Lepidopteren auf phyletischer Basis?" *Entom. Nachr.*, xxiv., 1898, pp. 296-300.

Observations on the genus *Catocala*: *C. pacta*, &c.

(Continued from Vol. X., p. 290.)

By E. M. DADD.

Catocala pacta.—Ova round, rather conical above, flattened beneath; the micropylar area flattened, smaller than in the egg of *C. electa*, and composed of five rings of cells. The egg measures about .04 in. The vertical ribs are more prominent than in *C. elocata* and *C. nupta*, and

vary in number from 32 to 40, about half of which combine before reaching the micropylar area. The colour is uniform bronze-green, which is sufficient to distinguish it from all others hitherto examined. The lateral ribs are very numerous. Only one larva emerged, but died from the exertion. I only mention the fact, as it goes to prove that the eggs were fertile. The imago is practically a small European edition of the following species.

C. concumbens.—The ova are very conical above; the micropyle rather large. The vertical ribs number about forty, the lateral ribs very fine. The colour is bronze-green, without any markings. In this respect it resembles the preceding. It measures about .045 in.

Two larvæ emerged during April, and as I had plenty of eggs, I unfortunately omitted to take any notes of their early stages, as I counted on having others later on. However, no more emerged, and one larva had meanwhile reached its third instar, the other having died. As far as I remember, in the first two instars it did not differ much from its near relatives, *C. nupta* and *C. electa*. In the third instar I also did not take notes soon enough, as on opening the glass to take the larva out, I found it moulting for the third time. The third instar was, however, very striking, as it did not resemble any of the others. The ground colour was yellowish-grey, with a red-brown patch on each segment, which would have formed a broad dorsal band, but for the fact that the segmental divisions were of the ground colour. The head was red-brown, with the usual streaks on the lobes. In the fourth instar the larva measured about 1½ in. The head red-brown, with a black streak on each lobe and black markings on the face. The ground colour is velvety reddish-brown, the segmental divisions, especially of the abdominal segments, which are very broad, forming paler rings, the larva being apparently ringed alternately with red-brown and grey. The hump is very small indeed for the fourth instar; it is red, with a minute black ring round it. The tubercles are also bright red, both anterior and posterior trapezoidals being very prominent and wart-like; the latter are somewhat larger than the former. The post- and subspiraculars are also large, the remainder being quite small and scarcely noticeable. The usual ridge is formed by the posterior trapezoidals of the eighth segment, the streaks also being present. The lateral fringe is well developed, and crimson in colour. Beneath the larva is much suffused with crimson, the spots being large. This larva died whilst moulting for the last time.

The imago is about as large as *C. nupta*; the fore-wings, head, and thorax smoky-grey; the collar brown. The fore-wings have two fine irregular black lines crossing the wings, one on each side of the orbicular. The orbicular itself is lighter than the rest of the wing, and just below it is a white spot. The hind-wings are pale crimson with both bands very regular. The marginal band is somewhat broader at the outer angle than at the inner angle, and tapers gradually; the inner band is very broad, it having evidently spread towards the base. The hind marginal fringe is white, the inner marginal fringe pale brown. On the under side this species has several significant markings. On the fore-wings the outer black band does not strike the hind margin about the centre as in *C. elocata* and *C. nupta*, but at the anal angle, thus leaving a band of grey along the whole length of the hind margin. The central band is not irregular, as in *C. nupta*. On

the hind wings the inner band is not broad and regular as on the upper side, but it is angled in the centre, though not so sharply as in *C. nupta*; hence we can conclude that on the upper side this band has been extended, especially on the basal side. The marginal band has its outer edge much encroached on by the colour of the fringe.

C. sponsa.—The ova are round above, depressed beneath. Micropyle small and very indistinct, with three rows of cells. It measures about .045in. The whole surface is dotted with minute raised points, so arranged as to form the points of a hexagonal pattern. There is no trace whatever of vertical or lateral ribs. The surface is smooth and shiny, chocolate-coloured with numerous yellow spots and a yellow ring just above the equator. It differs entirely from the ova of all the remaining species, probably the points are the last remnants of ribs.

The young larvæ emerged during March and April, and were fed on split oak-buds. The larva measures about $\frac{1}{4}$ in., and much resembles *C. promissa*. It is, however, almost entirely black, and the bluish-green bands observable in the latter are not present. In the second instar it measures about $\frac{3}{8}$ in., the head is dull black, the ground colour of the body yellow-brown, but it is so mottled with black that only a dorsal stripe and the segmental divisions retain their normal colour. The tubercles are small and black, those on the eighth abdominal being somewhat enlarged; each tubercle bears a short hair. Beneath it is pinkish-grey, with a purple-brown spot on each segment. The hump on the fifth abdominal is slightly developed. The third instar I was unable to describe owing to all the larvæ dying, but later on I managed to get one larva in its fourth instar. The general ground colour is then of a dirty grey with a cream-coloured horseshoe mark on the first abdominal; there is also a broad pale transverse band, partly on the fourth and partly on the fifth abdominal. The head is yellowish-brown with a black streak on each of the lobes, which taper to a point at the mouth. The legs are of the same colour as the head, the prolegs of the same colour as the rest of the body. The hump on the fifth abdominal is very curious, the top being pale yellow, surrounded by a black ring; it somewhat resembles that of *C. electa*. All the tubercles are red with a pale ring round them, but with the exception of the posterior trapezoidals all are very small. Beneath it is pale greenish-white with the spots on the segments dirty yellow-brown. This larva died whilst moulting for the last time, and I have no description of the fifth instar. Several larvæ given me by Mr. Bacot last year, from the New Forest, formed cocoons by drawing the sides of a large oak leaf together, and then spinning a rough silk lining. The pupa is smaller than that of *C. nupta*, measuring less than an inch. It does not otherwise differ from others of the genus.

The imago measures from 2 to 2 $\frac{1}{2}$ in. in expanse, but is generally smaller than *C. nupta*. The fore-wings are smoky yellow-grey, very much mottled with brown, black, and white, zigzag, transverse lines. The orbicular is white, with a large white patch on the basal side and a square yellow spot beneath. The hind-wings are dark crimson, the marginal band tapering very much towards the hind angle, and indented deeply twice to correspond with the angles on the inner band. The inner band is very narrow, with two sharp angles pointing outwards. Beneath it somewhat resembles *C. nupta*, the outer band of the upper wings striking the hind margin about the centre. The

black bands are, however, much broader, there being very little left of the pearly white bands. The hindwings are much suffused with crimson. The inner band does not reach the inner margin, but ends abruptly in the wing area. There is a lunular spot developed between the inner band and the base.

(To be continued.)

The Lepidoptera of Oban and District.

By W. G. SHELDON.

During the early portion of last July I was staying at this charming centre for tourists. In such portions of the time that were not occupied in excursions I managed to do some collecting, entirely during the daytime. Oban, as most people who have visited Scotland are aware, is situated on the shores of the Firth of Lorne; it is sheltered from the gales of the Atlantic by the Island of Kerrera, which is separated from it by an arm of the sea some half-mile in width. The country for ten or twelve miles inland consists chiefly of moors of several hundred feet elevation, very much broken up into hills and valleys, and except in the deeper valleys, bare, and without trees. The hills, however, immediately behind the town are planted largely with larch and spruce fir. These moors contain much bog, with a liberal growth of sweet-gale, bog asphodel, butterwort, and other plants typical of such places. Behind the moorland commence the mountains, prominent amongst which are the famous twin peaks of Ben Cruachan, some 3,700ft. in height, whilst looking to the north and north-west, across Loch Linnhe, the mountains of Morven and Mull, are everywhere seen. The rock formation is chiefly shale, but there is a considerable outcrop of granite in places.

Rhopalocera were poorly represented, and many species that might have been expected to occur were absent; a good deal of work was done with *Polyommatus icarus*, for aberrations, but except in one small locality in Kerrera, they were a most ordinary lot, and would have well passed for Surrey specimens. In Kerrera, however, I managed to obtain about a dozen of the finest forms I have ever seen; in the females the blue is exceedingly bright, and two of them have the entire upper sides, except the red markings, of the most brilliant blue; in others the red markings on the upper sides are brighter than in any I have seen from elsewhere; the males approach *P. bellargus* var. *alonis* in colour. *Coenonympha tiphon* was unaccountably absent, except for one specimen, one only of *Erebia aethiops* also occurred, but I was, of course, too early for all but stragglers of this species; a few *Adscita sticticus* were noticed at rest on flowers, probably the species had been abundant earlier in the year. One of the most interesting species observed during the visit was *Anthrocera purpuralis (minos)*, of which my son found a specimen at rest on the day after our arrival. A visit to the spot next morning resulted in our netting a few more, but it was evidently *passé*, only a short series of rather over a dozen could be made up. It will be remembered that Dr. Buchanan White recorded (*Entomologist*, ix., p. 142) that he had this species in his cabinet from near Oban, and also from Forfarshire; and probably the specimens there alluded to were taken nearly 30 years ago. The locality is a very

small one, about 200yds. long and 20yds. wide, being one side of a steep valley, some 300ft. or 400ft. above sea level, and about a mile inland; there is a good growth of wild thyme here, and no doubt on this plant the larvæ feed; there are probably other localities in the district, but I could not find one, though careful search was made. Judging from the nature of the country, however, I should be surprised if the species is not widely distributed along the coast of Argyleshire, and amongst the Inner Hebrides.

Specimens of *Anthrocera filipendulae* were well distributed, but were nowhere common. Four fine large *Setina irrorella* were in the nature of a surprise, but as one of them was an IVI aberration (ab. *signata*) the surprise was a very pleasant one. No night work being done, the Noctuids were, of course, hardly seen, and the only species that calls for note was *Plusia interrogationis*, which was scarce. Amongst the Geometrids more species were observed. *Boarmia repandata*, of the Rannoch form, was not uncommon, sitting on the rocks, and the same remark applies to *Dasydia obfuscata*; *Gnophos obscurata*, large and dark specimens were obtained; *Acidalia fumata* occurred freely amongst ling; *Larentia caesiata* was not common; of *L. salicata* two specimens were observed; *L. olivata* was common, but local; *L. viridaria*, common, large and well marked; a few specimens of *Eupithecia pulchellata*, of a very light form, quite different from southern ones, were sitting on the rocks, and the larvæ were very common in the foxgloves; one *E. constrictata* and a few larvæ occurred in the *A. purpuralis* (minos) locality; *Melanthia ocellata* were common in one valley; *Melanippe galiata*, with a very broad and dark band, were not uncommon.

One day spent on Ben Cruachan was the most fruitful in collecting of the trip: *Erebia epiphron*, *Larentia caesiata*, *Emmelesia minorata*, *E. adequata*, *Scopula alpinalis*, *Crambus ericellus*, and *C. furcatellus* were amongst other species taken. I believe this is an unrecorded locality for *E. epiphron*, in any case it is an exceedingly good one, the butterfly swarmed all over the mountain, south of the Cruachan Burn, and from 1,000ft. to 3,000ft. Had I not been intent on attaining the summit, and had I so desired, no doubt several hundreds could have been netted. A walk across the Island of Mull, from Salen to Loch Ba, was, from an entomological point of view, the most barren of my experience. Only one moth was seen, although the country round looked most promising; as this, however, was a form of *Camptogramma bilineata*, which I do not remember to have seen previously, with a black fascia, divided transversely by a yellow bar, the quality was decidedly better than the quantity. The only larvæ obtained, except those before-mentioned, were about two dozen of *Dianthoecia conspersa*, and a few *Eupithecia venosata*, feeding in capsules of *Silene maritima*, from which I hope to breed some interesting specimens next year.

Migration and Dispersal of Insects: Orthoptera.

By J. W. TUTT, F.E.S.

Almost all the insects known in popular language as "locusts" are members of the family *Acridiidae*, of which there are probably 2,000 species already known to exist in different parts of the world, and to

only a few of these can the name "locust" be more or less properly applied. The term "locust," as properly used, may be considered as referring to particular species of grasshoppers, which occasionally increase greatly in numbers, and which then move from place to place in search of food. The true migratory locusts are species with gregarious habits, which move about in vast swarms, sometimes for considerable distances. Of these there are but few species, although they occur in many parts of the world.

The endemic species of locusts usually do but little harm, but the migratory kinds inflict great damage on the crops of the countries they visit. A large swarm will often, in the space of a few hours, clear off all the vegetable food that can be eaten and leave nothing green over a vast area, and it is practically impossible for any one who has not seen such a swarm to realise the injury inflicted. Carruthers describes a flight of locusts that passed over the Red Sea in November, 1889. He estimated it at 2,000 square miles in extent and the weight of the locusts at 42,850,000,000 tons, assuming each locust to weigh only one-sixteenth of an ounce; whilst he further states that a second similar, and probably larger, flight was seen travelling in the same direction the next day. That these estimates are possibly not at all exaggerated is very probable, judging from other accounts of similar flights. Sharp says that from official accounts referring to the locusts in Cyprus we find that in 1881, up to the end of October, 1,600,000,000 egg-cases had been that season collected and destroyed, each case containing a considerable number of eggs. By the end of the season the weight of the eggs collected and made away with amounted to over 1,500 tons, and, notwithstanding this, no less than 5,076,000,000 egg-cases were, it is believed, deposited in the Island in 1883.

The consideration of the migration of locusts becomes very interesting from the fact that it is based on one well-known necessity—the want of food. From this fact the movements of these insects are less complicated and uncertain, and more distinctly traceable to a given cause than those of any other order of insects. Inhabitants of those fertile countries which travellers in the Tropics have made known to us, the migratory locusts are sometimes produced in such marvellous numbers that they devastate the countries they traverse, changing the most fertile spots into a wilderness, and then, obliged to seek fresh pastures, renew their journey in order to obtain the food necessary for their sustenance.

To obtain this food immense journeys are undertaken by them and almost incredible distances covered. Practically polyphagous, scarcely anything comes amiss to them as food, and, hence, when a swarm settles upon cultivated ground, the damage it does is incalculable. Certain plants, among others *Leguminosæ* and *Cucurbitaceæ*, are said, however, to have practical immunity. Every continent has, more or less, its own particular locust pests, Europe being, perhaps, of all the great land divisions, the least subject to their visits.

The order Orthoptera, to which, as we have already mentioned, locusts belong, is supposed to be one of the oldest orders of insects known. Remains of these insects, differing but little from some that now exist, have been found in rocks of Carboniferous and Silurian age, and since the more recently evolved insects—butterflies, moths, bees, ants, and two-winged flies—are supposed to have been more or

less indirectly evolved from these older forms of insect life, the migration of the latter in search of food gives us at least a clue whence other insects obtained their migrating instinct.

Swarms of locusts do not invade the same country year after year, but, as a rule, successive invasions take place only after a long interval. It has been calculated by Riley that invasions of locusts only take place in North America, on an average, once in about eleven years—1845, 1864, 1866, 1874, and 1891 are given as years in which swarms took place. This irregularity in the period of invasion appears to be due to the circumstance that an invasion can only take place in a year when meteorological conditions favour the production of the locusts to such an extent that a vast superfluity of individuals is produced in those districts in which the insects are normally sedentary and comparatively harmless. The abnormality of the excess, giving rise to large requirements in the direction of food-supply, seems to put in motion the migratory instinct. It must not be altogether overlooked that possibly some unfavourable checks on the usual parasites of these insects may also lead to an increase in their number, for it is perfectly well-established that the migratory species of locusts do exist in countries without giving rise to swarms, and without doing much harm, their natural enemies keeping them well in check. Thus, one of the most important of the migratory locusts, *Pachytylus cinerascens*, is always present in certain parts of Belgium and Central Europe without giving rise to swarms.

It is remarkable that, although many years may elapse between two swarms of locusts going off from a given district, yet the swarm usually takes a fixed direction and follows that taken by its predecessors. It would appear probable, too, that their movements are to some extent dependent on the wind, and it has been reported that they make trial flights to ascertain whether or not its direction be favourable. It is also probable that, once they are on the wing, little muscular exertion is necessary to keep up the pace at which they fly, for their bodies contain elastic air-sacs in communication with the tracheæ. It is further possible that, at the time of flight, the body is, to a great extent, devoid of food, and the internal space in which the air-sacs may increase in size is further enlarged by the ill-developed condition of the ovaries in the early life of the perfect insect.

As a rule, it is, of course, the adult locust that migrates, for locusts do not attain their wings until the final ecdysis. In spite of this, however, Sydon, Dönzingk, Téchemewsky, Finot, and others describe the migrations of the larval forms, and some of the South African species appear to carry out extensive migrations before they have reached the winged stage. These migrate on foot, and are called by the Dutch, "Voetgangers." Having stripped a district of everything green, they move on in search of new feeding-grounds. The direction they take is always to the interior, strangely enough, towards the lands from which their winged progenitors departed. What have been assumed to be return swarms of adults have been noticed in America, and the facts connected therewith were ascertained by a United States commission appointed to enquire into this subject.

Mrs. Barber describes the remarkable manner in which the wingless locusts of South Africa occasionally cross broad rivers. The observation recorded was made on a swarm of young locusts that

crossed the Vaal river in 1871, shortly after the discovery of the diamond fields. The country was devastated by young locusts, and a swarm made its appearance on the banks of the Vaal River. For several days the locusts travelled up the stream, reaching an abrupt bend in the river, where a number of rocks cropped out. At this point they stopped some time, but at last went on again. Three days afterwards, however, they returned to the same bend of the river, plunged in vast multitudes into the stream, and, assisted by a strong current and by the waterplants growing there, they managed to effect a crossing, although many were drowned and carried away by the flooded river.

The same lady states that these "Voetgangers" have been known to cross the Orange river where it was several yards in breadth. Attaching themselves to one another in vast numbers, they formed large floating islands, and it is possible that some of these reached the opposite bank in safety. Sharp says that "it is a common practice for young locusts to form a bridge over a moderately broad stream by plunging indiscriminately into it and, holding on to each other, grappling like drowning men at sticks or straws, or, in fact, anything that comes within reach and that will assist in floating them. Meanwhile, those from behind are eagerly pushing forward over the bodies of those that are already in the stream, and hurry on to the front, until at length, by this process, they reach the opposite bank of the river. Thus, a floating mass of living locusts is stretched across the stream, forming a bridge over which the whole swarm passes. In this manner few, comparatively speaking, are drowned, because the same individuals do not remain in the water during the whole of the time occupied by the swarm in crossing, the insects continually changing places with each other, those that are beneath endeavouring to reach the surface by climbing over others, whilst those above them are, in their turn, being forced below." Dönzingk relates having seen young locusts swim over the Dnjestr for a distance of $1\frac{1}{2}$ German miles, in layers 7 or 8 in. in thickness.

There seems to be considerable doubt as to the rate at which larval locusts travel. Finot is logical in assuming that this varies greatly with age, and depends to a great extent also on food and temperature conditions. Following Durand, he asserts it as about 1 kilomètre per day after the larva has reached the age of 15 days. Sydon and Dönzingk give about .975 of an English mile per hour, a distance possibly very much too great even for the most active. Téchemewsky asserts that they only advance about 350ft. per day on grass land.

It is, however, in the winged state that the greatest number of "locust" migrations takes place. Biblical history has made us conversant with the vast size of the migratory hordes which frequently occur in Asia and Africa. The adult winged locust is able to travel very great distances, and there seems to be very clear evidence that the migratory swarms often travel by night. It is possible, however, that they cannot cover the whole of the distance from the country they leave to that to which they are bound without stoppages by the way, and the attempt to take too long journeys must often end disastrously, for they have frequently been found in the sea in immense numbers at a considerable distance from land, having

evidently come to grief in crossing. They have often been observed migrating at a great distance from the land. Darwin states that a large species of *Aceridium* flew on board the Beagle, when the ship was to windward of the Cape de Verd Islands, and when the nearest point of land, not directly opposed to the trade wind, was Cape Blanco, on the coast of Africa, 370 miles distant. Scudder records that on November 2nd, 1865, a ship, making the voyage from Bordeaux to Boston, when 1,200 miles from the nearest land was invaded by a swarm of *Schistocerca peregrina*, the air and the sails of the ship being filled with them for two days.

Sloane in his "History of Jamaica" states that, in 1649, locusts devastated the Island of Teneriffe, that they were seen to come from Africa when the wind was blowing thence, that they flew as far as they could, then alighted on the water, one on the other, till they made a heap as big as the greatest ship, and that the next day, being refreshed by the sun, they took flight again and landed in clouds at Teneriffe.

De Saussure considers that the great oceans are, as a rule, impassable barriers and that not a species of the *Cedipodides* has passed from the Old World to the New. Sharp, on the other hand, thinks it possible that *Schistocerca peregrina*, one of the *Aceridiodea*, may have been, originally, an inhabitant of America, and that it passed from thence to the Old World.

As we have already stated, the true migratory locusts are not at all numerous. The most abundant and widely distributed is *Pachytylus cinerascens* which has invaded a large part of the Old World from the western shores of Europe to China. It is the commonest of the migratory locusts in Europe. A nearly allied species, *P. migratorius*, appears to limit its migrations to Turkestan and eastern Europe, whilst *P. marmoratus* has almost as wide a range in the Old World as *P. cinerascens*. It is, however, more distinctly confined to tropical districts. All these species belong to the tribe *Cedipodides*.

(To be continued.)

ORTHOPTERA.

Three New Species of *Platycleis* from Herzegovina.

By MALCOLM BURR, F.E.S., F.Z.S.

In my trip in south-eastern Europe during last summer, I took three new species of Orthoptera in the great Prenj group of mountains in northern Herzegovina. It is a curious fact that they are all of the same genus, namely, *Platycleis*, Fieb., and, further, two of them are very closely allied, and fall into the same division of the genus, which includes also *P. saussureana*, Frey, and *P. fusca*, Br. The first of these occurs in the mountains of Central Europe, while the latter has been, so far, only recorded from Taygetes. The third of my species is very distinct in possessing a well marked central carinula on the disc of the pronotum. No other described species of the genus has this character, the carinula usually being only visible on the posterior part. Brunner informs me, *in litt.*, that he possesses a female of an undescribed species from the Caucasus, showing the same peculiarity. It falls into the group containing *P. vittata*, Charp., and *P. tessellata*, Charp.,

judging from the shape of the ovipositor, and seems closely allied to *P. nigrosignatus*, Costa. I took several specimens among weeds in sheltered hollows on the barren rocky plateau of Bicevica, in the southern part of the range, a day's walk north of Mostar. The other two were taken in beds of nettles further north, close to the valley of Tisavica and the peak of Ortish. This latter mountain reaches an altitude of 1209 mètres, and so I would estimate the elevation at which these species occurred at about 1800 mètres. The region all around the exact spot where I took them is extremely barren and stony, inhabited almost entirely by such mountain-loving insects as *Gomphocerus sibiricus*, L., and *Stenobothrus miniatus*, Charp. It was only in the sheltered nooks and hollows that I found any richness of insect life. *P. raia* and *P. prenjica* both showed a considerable quantity of green when alive, but as I had unfortunately run out of formaline I was obliged to keep them in spirit, which has bleached the colour. It is impossible to remember exactly the proportions of the colouring, but probably all, or the greater part, of that which is now testaceous, is dark green in the living insect. The general appearance of both these species when alive, is very much like that of *P. brachyptera*, Linn.

PLATYCLEIS RAIA, sp. n.—Statura modica. Colore testaceo, fusco-variegato. Pronotum supra planum, testaceum, carinula media postice leviter expressa, lobis deflexis testaceis, fusco-notatis, postice pallido-marginatis. Elytra testacea, segmenta, in ♂ 8, in ♀ 7, attingentia, apice acuminata. Pedes omnes testacei, fusco-notati. Segmentum anale ♂ medio divisum. Cerci ♂ testacei, apice infuscati, medio dente decurvo nigro armati. Lamina subgenitalis ♂ margine postico medio distincte triangulariter emarginata, lobis rotundatis. Ovipositor parum incurvus, acuminatus, testaceus, apice infuscatus. Lamina subgenitalis ♀ hexagonalis, margine postico leviter triangulariter excisa. ♂ ♀. Long: corporis ♂ 16mm., ♀ 18mm.; pronoti, ♂ 5mm., ♀ 5mm.; elytrorum, ♂ 9·5mm., ♀ 9mm.; femorum posticorum, ♂ 16·5mm., ♀ 17mm.; ovipositoris, 9·5mm. *Patria*: Tisavica, in montibus Prenj, Herzegovina, July 24th, 1898 (Burr).

PlatyCLEIS raia is very close to *P. saussureana*, Frey, from which it may be distinguished by its paler colour, longer and more pointed elytra, and paler femora, varied with black. The subgenital lamina of the male is more deeply emarginate, with rounded lobes, and not straight as in *P. saussureana*, Frey. In the female the ovipositor is testaceous and not uniform fuscous, and the subgenital lamina is hexagonal and less deeply excised. I took two males, one female, and one female nymph.

PLATYCLEIS PRENJICA, sp. n.—*P. fuscae* vicina. Colore viridi vel fusco-testaceo. Pronotum supra planum vel subconcauum, carinula media postice expressa, lobis deflexis fuscis, subtus et postice pallido-marginatis. Elytra pallida, brevia, segmentum 5, attingentia, valde obtusa. Abdomen viride vel testaceum, fusco-variegatum. Femora omnia testacea, postica pagina externa linea angusta nigra ornata. Segmentum anale ♂ minus excavatum, margine postico medio tuberculis 2 instructo. Cerci ♂ validi, laminam subgenitalem vix superantes, medio dente recto valido armati. Ovipositor sensim acuminatus, incurvus, fuscus, pronoto plus duplo longior. Lamina subgenitalis ♀ obtusa, triangulariter obtuse emarginata, lobis obtusis, medio carinata. Lamina subgenitalis ♂ margine integro. ♂ ♀. Long: corporis, ♂ 16·2-17mm., ♀ 14-17mm.; pronoti, ♂ 4-5mm., ♀ 4·5-5mm.; elytrorum, ♂ 5·5mm., ♀ 4mm.; femorum posticorum, ♂ 13-13·5mm., ♀ 14mm.; ovipositoris, 11mm. *Patria*.—Tisavica, in montibus Prenj, Herzegovina, July 29th, 1898 (Burr).

Of this species I took three males and five females. It was numerous in a bed of nettles, exactly on the edge of the Tisavica valley, quite close to the peak of Ortish, about two miles from the bed where I took *P. raia*. It differs from *P. fusca*, Br., in the less strongly marked carinula on the posterior part of the pronotum, by the side

flaps of the pronotum being pale-bordered beneath as well as on the posterior margin, and by the green abdomen, varied with black. The elytra are paler, and the cerci of the male are toothed in the centre and not at the apex.

PLATYCLEIS ORINA, sp. n.—Parva, grisea. Occiput vitta nigra postoculari, vittisque duabus centralibus fuscis, ornatum. Pronotum supra planum, carina media per totam longitudinem perducta, distincta, lobis deflexis postice pallidomarginatis. Elytra abbreviata, segmentum abdominale 4 vix superantia, apice rotundata, area discoidali maculis atris ornata. Femora postica utrinque nigrovittata. Abdomen fuscum necnon indistincte nigro-notatum; segmentum anale ♂ valde excavatum, lobis triangularibus. Cerci ♂ validi, laminam subgenitalem superantes, dente in tertia parte apicali armati. Ovipositor pronoto vix longior, basi ipso rectus, deinde valde decurvus, niger. Segmentum 7 ♀ ventrale carinatum. Lamina subgenitalis ♂ elongata, angusta, apice triangulariter excoisa, tricarinata. Lamina subgenitalis ♀ sulcata, lata, valde emarginata, lobis rotundatis. ♂ ♀. Long: corporis, ♂ 14-16.5mm., ♀ 14.5-16mm.; pronoti, ♂ 3.5mm., ♀ 4.5mm.; elytrorum, ♂ 5mm., ♀ 5mm.; femorum posticorum, ♂ 14.5-15mm., ♀ 15mm.; ovipositoris, 4.5-5mm. *Patria*.—Bicevica, in montibus Prenj, northern Herzegovina, August 1st, 1898 (Burr).

This species is very close to *P. tessellata*, Charp., and to *P. nigrosignatus*, Costa. In its anal parts it agrees entirely with both, but may be distinguished at once by the very distinct carina on the pronotum, which is produced through the whole length of the disc.

COLEOPTERA.

The Coleoptera of an old Ash-tree.

By J. J. WALKER, R.N., F.L.S., F.E.S.

It is a common remark among coleopterists that at the present day, except in a few favoured localities, such as the New Forest, trees available for beetle-hunting are much less frequently met with than was the case even a few years ago. As soon as a tree shows signs of decay and begins to attract beetles, down it comes and is usually carried away at once; and it is only in rare instances that one is left long enough for the collector who is lucky enough to come across it, to avail himself of its coleopterous resources. Still, even in the neighbourhood of the metropolis, a good tree is sometimes found and worked out, and the list of species found in a single ash-tree in Cobham Park, my favourite collecting-ground in Kent, may be interesting enough to be put on record.

The tree in question stood near the Mausoleum, and a few yards to the left of the main path through the park to the village of Cobham, and was one of the largest and most handsomely grown of the many fine trees of its kind in that noble demesne. It measured over 20ft. in girth just above the ground, and when my attention was first attracted to it in the summer of 1889, it showed no outward signs of decay, except a copious growth of hard fungus (*Polyporus*) round the base, and a small hollow into which I could just get my hand, extending downwards for some distance into the roots. Out of this hollow I took, in the above-mentioned year, a good many specimens of the rare little *Abracus granulum*, Er. (cf. *Ent. Mo. Mag.*, ser. 1, vol. xxv., p. 360), and in August the beautiful *Platycis minutus* was found in considerable numbers crawling on the mossy bole of the tree towards evening, and shaken out of dry fungus piled up as a "trap."

I did not visit the tree again until July, 1893, when seven speci-

mens of *Platycis minutus* were taken. This beetle was again found in August, 1895, in fair numbers, and in the following year (1896) more than 70 specimens were taken by Mr. R. W. Lloyd and myself by simply searching the tree-trunk and the adjacent nettles on warm damp evenings just before sunset, without disturbing a particle of the wood or bark. The end of the great tree was, however, very near. Soon after one of the heavy gales which prevailed at the end of September, 1896, I was astonished and grieved to find the giant lying prostrate, a picturesque ruin, with the cause of its downfall only too evident. The wonder was that it had remained standing at all, for with the exception of a mere shell of bark and sound wood not more than three or four inches thick, the whole interior of the trunk to a height of seven or eight feet was a mass of crumbling touchwood, into which a walking stick could readily be thrust up to the handle. It had been reduced to this condition by the larvæ of the small stag-beetle, *Dorcus parallelipedus*, whose burrows traversed the mass of rotten wood in every direction, with those of its ally *Sinodendron cylindricum* in much lesser numbers; the first-named beetle, which I had always found plentifully in the perfect state, must be held responsible for the destruction of this splendid tree.

In the following winter the stump was cut off nearly level with the ground, and the sound portions of the trunk cut up into cord-wood and subsequently removed. Nothing now remains except the thin shell of the stump and the roots, and two gigantic and perfectly sound limbs, fair-sized trees in themselves, which have not yet been carried away. Access to the interior of the stump being now easy, I have carefully "nursed" the same by putting back every particle of rotten wood, fungus, &c., after examination, and have continued to find interesting beetles up to the present time. On my last visit a few days ago, in company with Mr. A. J. Chitty, we each took several examples of the rare little *Quedius microps*, Grav. (*chrysurus*, Fries), and one or two other uncommon species.

The following list comprises the more interesting beetles which have been found in and about the tree from June, 1889, to the present date, very common species being omitted:—*Amara orata*, *Abax striola*, *Calathus piceus*, and *Tachypus flavipes*, under chips and pieces of cord-wood; *Aleochara cuniculorum*, one in wet, rotten wood, March 25th, 1897; *Bolitochara lucida* and *bella*, *Harbrocerus capillareicornis*, and *Epipeda plana*, all more or less common. *Quedius microps*, not uncommon in damp wood-mould, chiefly in early spring and late autumn, and not easy to detect, as it feigns death with great persistency; *Q. mesomelinus* and var. *fageti*, Thoms, not rare. *Leistotrophus nebulosus*, *Philonthus aulendus*, Sharp, and *proximus*, in fungus; *P. finetarius* and *umbratilis*, in rotten wood. *Baptolinus alternans*, *Homalium eriguum*, *nigriceps*, and *iopterum*, all rather scarce. *Bythinus curtisi*, sometimes common; *Liodes humeralis*, *Choleva cisteloides*, *nigricans*, *fusca*, *nigrita*, and *chrysomeloides*, all more or less frequent in rotten wood and fungus; *C. colonoides*, one example of this very rare little species in wet, rotten wood-mould, out of a hole in a root, April 24th, 1897. *Ptenidium turgidum*, sometimes fairly common among the wood-mould in late summer. *Hister succiola*, in rotten fungus; *Abrarus globosus*, common; *A. granulum*, Er. many specimens in 1889, and a few under pieces of cord-wood in early spring, 1896;

Paromalus flavicornis, occasional. *Cerylon histeroide*s and *ferrugineum*, both not rare; *Scaphisoma boleti*, frequent. *Mycetophagus quadriguttatus*, two examples in fungus, June, 1894; *Diphyllus lunatus*, rare. *Dorcus parallelipedus*, found commonly in the perfect state until the fall of the tree, and in the rotten interior, with *Sinodendron cylindricum*. *Trox scaber*, two or three specimens. *Prionocyphon serricornis*, one example in rotten wood-mould, July 19th, 1897. *Platycis minutus*, appeared in the third week of August in 1889, 1895, and 1896, but in the hot summer of 1893 was found at the end of July; it has not been seen since the downfall of the tree, nor have traces of the larva or the perfect insect been found in the bark or rotten wood. *Cis nitidus*, *C. bidentatus* and *Ennearthron cornutum*, in fungus. *Hylesinus crenatus*, not uncommon in the thick bark of the trunk and larger branches.

Altogether 70 species at least of Coleoptera have from first to last been found in this one tree.

COLEOPTERA OF NORTH WALES.—North Wales shared with the rest of the kingdom the climatic conditions incident to the worst half of 1898. A mild winter, followed by a cold and wet spring extending far on into June, was succeeded about the middle of that month by a spell of bright hot weather, in which the anti-cyclonic features were well marked. Being at this time in the vicinity, I availed myself of the favourable opportunity to visit Aber, for the twofold purpose of viewing the falls and doing a little collecting by the way. In former days Aber was important as the point of departure for Beaumaris across the Lavan Sands, which are bared at low water almost to the opposite shore, but to-day Aber's great attraction is undoubtedly its famous fall, which lies distant some four and a half miles from the railway, at the head of one of the most beautiful glens in Wales. On leaving the station *Byrrhus pilula* was early in evidence crawling on the hot dusty road, where also a little further on, near the rectory, renowned for its large myrtles growing in the open, our first capture was made in *Leistotrophus nebulosus*. Proceeding through the village, rendered doubly attractive at this period of the year by the wealth of blossom in the cottage gardens, Pont Newydd was soon reached, where, quitting the road, we followed the path to the right of the brook. Here some young elders yielded *Phyllobius calcaratus* and *P. pyri*, whilst crawling on the track were *Staphylinus erythropterus* and *Corymbites aeneus*—one of the latter of an exceptionally light blue. We here crossed by the little wooden bridge to the left bank of the mountain stream from which the village below takes its name—this, rendered in full, being Aber-gwyn-gregan—the stream of the white shells—derived, presumably, from the quantity of cockles found near its mouth. Much beating of hawthorn, the blossom of which was nearly over, scarcely repaid the time and labour bestowed upon it, *Leioptus nebulosus* and the ubiquitous *Grammoptera ruficornis* being the only things obtained worthy of mention. Amongst stones further up the glen occurred *Othius melanocephalus*, *Quedius semiaeneus* and *Ocyrops ater*; *Philonthus decorus* being shortly afterwards added to our list. *Tachypus flavipes*, *Calathus piceus*, and a few other of the usual Geodephaga were met with in varying abundance, whilst sweeping low herbage and coarse grass beneath the trees produced *Dascillus cervinus*,

Cytillus varius, *Telephorus paludosus*, *T. nigricans* var. *discoideus*, *Rhagonycha testacea*, *Gronops lunatus*, etc. On nearing the falls one specimen of *Telephorus obscurus* was captured—a good series of this desirable species being taken higher up on the mountains the following day. Continuing our efforts with the sweep-net, we took *Corymbites tessellatus* and *C. cupreus* with the variety *aeruginosus*, amongst the latter of which the males largely predominated, being especially abundant on bracken. *Aphodius ater* and *lapponum* were plentiful both in their usual habitat and on wing, and one specimen of *A. tristis* was secured. *Podabrus alpinus* and *Corymbites quercus* by beating, *Liodes humeralis* from fungi on rails at the falls; and *Lesteva pubescens*, from moss (?) completes (with the addition of *Flater pomorum*, taken later on near Bangor) what, from a coleopterist's point of view, must appear a somewhat meagre list; but what we lacked in captures was amply made up for by the brilliancy of the day and the rich beauty of the scenery of this, perhaps, the most picturesque of Welsh glens.—E. J. BURGESS-SOPP, F.E.S.

VARIATION.

RARE ABERRATIONS OF *NONAGRIA CANNAE*.—Amongst a long series of this species bred from pupæ obtained in the Norfolk Fens last August are two forms which I have never seen before amongst the many hundred specimens examined at different times; one, a female, has the primaries a bright rosy red, the other, a male, is an extreme melanic form, both the primaries and secondaries, and also the thorax and abdomen, being of a very deep brownish-black.—W. G. SHELDON. Nov. 17th, 1898.

A MELANIC ABERRATION OF *ACIDALIA AVERSATA*.—During the month of May last my son found a Geometrid larva crawling on the Bishop's palms at West Wickham, which without feeding changed into a pupa in a small pill-box; the imago emerged in June, and turned out to be, so far as my experience goes, an aberration of *A. aversata* which is unique, and very striking. The cilia, thorax, anal tuft, legs, head, and antennæ are normal in colour, the wings and abdomen black.—W. G. SHELDON. Nov. 17th, 1898.

VARIATION OF *HYDRILLA PALUSTRIS*.—I have four specimens of *H. palustris* in my cabinet, and they differ so much from one another that it seems worth while to note the differences: (1) *Specimen taken by Mr. A. Houghton in June 1894*.—The forewings are of a rich dark brown colour (similar to the ordinary form of *Rusina tenebrosa*) rather lighter beyond the elbowed line, which therefore becomes distinct. The discoidal spot forms a black dot, and there are traces of a black spot at the reniform. (2) *Specimen taken by Mr. A. J. Hodges, June 1894*.—Uniform, clear pale brown, slightly ochreous in tint, markings quite distinct, consisting of a dark discoidal spot and reniform, dark elbowed and subterminal lines, but no trace of the irregular transverse line between the discoidal spot and the base, mentioned by Mr. Tutt (*Varieties of British Noctuae*, vol. i., p. 143). (3) *Specimen taken by Mr. S. Bailey, June 1898*.—Similar in colour to No. 2, but unfortunately much rubbed. The irregular transverse line, mentioned as being absent in the last specimen, very distinct. (4) *Specimen taken by Mr. S. Bailey, June 1898*.—Uniform blackish-grey, with no brown

tone at all. No markings observable, except the discoidal spot, which is black. Hind wings smoke-colour. It will be observed that none of the specimens have any tendency to the violet tint mentioned in Newman's *British Moths*.—J. C. MOBERLY, M.A., F.E.S., 9, Rockstone Place, Southampton.

In view of Mr. Moberly's note, it may be of interest if I add descriptions of the five *Hydrilla palustris* I now have in my cabinet. They are all in fine condition, and the markings quite clear, and were all captured at Wicken, June 13th-15th of the present year. I fancy (but my recollection may be at fault) that when fresh, one or two had a violet tint about them, but there is no trace of it now. (1) Forewings pale ochreous-brown, much the colour of normal *Caradrina alsines*, the transverse basal line nearly straight, the elbowed line distinct, but no trace of the subterminal; small but distinct discoidal and reniform spots. Hindwings slightly lighter than forewings (This is so in each of the specimens). (2) Altogether a trifle darker than 1. The basal, elbowed and subterminal lines quite distinct, the basal much more sharply angled than in 1, the discoidal spot very small, the reniform similar to that of 1. (3) Same colour as 2. The subterminal line rather indistinct, the basal and elbowed lines peculiarly well-marked and clear; the basal line not quite so sharply angled as in 2, but much serrated; no discoidal spot, nor trace of one (in fact one of the serrations of the basal line covers the place where the spot should be); reniform similar to those of 1 and 2. (4) Similar in colour to a rather light *Rusina tenebrosa*; all three lines very indistinct, very minute discoidal and small reniform. (5) Paler than 1, a brownish stone colour; all three lines except the subterminal indistinct, very minute discoidal and small reniform.—E. F. STUDD, M.A., B.C.L., F.E.S., Oxtou, near Exeter.

ABERRATIONS OF *ABRAXAS SYLVATA* (ULMATA).—In July last similar aberrations to those described by Mr. Tutt (*Ent. Record*, vol. ix., pp. 305-307) last year, again made their appearance in the same locality. The leaden-blue form, however, which last year was almost invariably found with its wings crumpled or slightly crippled, was taken quite perfect this season. Many of the females were very dark and of good size. Intermediates of all kinds occurred, but the number of hopeless cripples, of this form, chiefly on the left side, was astonishing.—S. Walker, Eddercliffe, Queen Anne's Road, York.

ABERRATION OF *COENONYMPHA PAMPHILUS*.—During my stay in the New Forest I captured on July 26th last, a fine specimen of *C. pamphilus*, of a pretty cream colour. Have you heard of such a specimen before?—W. J. Cross, Ely.

NOTES ON COLLECTING, Etc.

BLEPHARIDES VULGARIS, FLN., PARASITIC ON *ANTHROCERA TRIFOLII* VAR. *PALUSTRIS*.—Recently M. Oberthür, of Rennes, sent me a dipterous and a hymenopterous parasite that he had bred from larvæ of *A. trifolii* var. *palustris*, captured near Rennes. The former has been identified by Mr. Austin as *Blepharides vulgaris*, Fln.—J. W. TUTT.

ABUNDANCE OF *SPHINX CONVULVULI* AT BOURNEMOUTH.—*S. convulvuli* was very plentiful here last summer, over 60 having been captured. One collector alone took 30. I was late in looking for them, but

captured 19, all but three being females, some of which were very large, and the hind-wings very strongly marked.—W. G. HOOKER, Claremont, Alington Road, Bournemouth.

ACHERONTIA ATROPOS IN GUERNSEY.—On November 8th a friend sent me a full-grown larva of *Acherontia atropos*, which had been brought from his garden into the house by a cat. It seemed very healthy, and was not injured in any way. Two days afterwards it entered the ground.—W. A. LUFF, Mount Pleasant, Burnt Lane, Guernsey. November 21st, 1898.

AGROTIDS AT TENBY.—At Tenby during the first fortnight of July I found only *Agrotis vestigialis* really abundant at sugar, but of this species I obtained half-a-dozen beautiful dark females. *A. tritici* and *A. cursoria* were much rarer than usual, and of *Actebia praecox* I only captured two.—(Rev.) E. C. DOBREE Fox, M.A., Castle Moreton, Tewkesbury.

LEPIDOPTERA AT CHELTENHAM.—I found insects very rare at Cheltenham after my return there in the middle of July last. With the exception of *Eubolia bipunctata*, *Tanagra chaerophyllata*, and *Eubolia limitata*, which were common, a few each of *Gnophos obscurata*, *Acidalia ornata*, *Anthrocera loniceræ*, *Triaena psi*, *Ennychia cingulalis*, *Melanippe galiata*, and single specimens of *Phibalapteryx tersata* and *Eupisteria heparata*, both new to the Cheltenham list, I captured nothing on the hills of importance. At the electric lights in the streets, *Zeuzera pyrina* and *Leucoma salicis*, among other species, occurred. These also were new to the local list. Larvæ of *Dianthoecia carpophaga* and *Eupithecia venosata* were common in seed-heads of *Silene inflata*. Between June 13th and July 8th I took nothing except several larvæ of *Abraças grossulariata* and *Malacosoma neustria*; no aberrations of the former were bred, but a fine dark, unicolorous, red male of the latter.—(Major) R. B. ROBERTSON, The Holt, Berkeley Street, Cheltenham.

APORIA CRATAEGI, POLYGONIA C-ALBUM, AND SPHINX CONVULVULI AT DOVER.—I am glad to be able to record the capture of *Aporia crataegi* again this year, but regret that it is much scarcer—I took but a dozen specimens. I have seen several *Colias edusa*, and a friend of mine tells me that only last week he saw several in the Warren, close here. This collector took a very good specimen of *Polygonia c-album* at the beginning of September, and saw another in the Warren. I do not think this butterfly has been taken in this neighbourhood since the one taken by Mr. Sydney Webb in October, 1894, and recorded in *The Entomologist*, vol. xxviii., p. 321. I had a specimen of *Sphinx convulvuli* brought to me last week, and have since seen other specimens which have been taken from the electric light lamps here. A few larvæ of *Acherontia atropos* have turned up, but were unfortunately killed by the finders because they had done irreparable damage!—H. DOUGLAS STOCKWELL, 2, Albert Road, Dover. November 14th, 1898.

APORIA CRATAEGI AND POLYGONIA C-ALBUM IN KENT.—I am able to record the capture of *Aporia crataegi* in Kent this year, having taken a considerable number; also one specimen of *Polygonia c-album*.—J. BANKS, 19, Odo Road, Tower Hamlets, Dover, December 6th, 1898.

NOTES FROM THE NEW FOREST.—I found sugar to be of no use until September, when a few insects came. Most of these showed that the species were very late, but on September 12th I took a specimen of

Caradrina ambigua, followed by another on the 17th. I believe this is a new locality for the species, and is it not a very late date for its capture? Larvæ were very scarce, especially the usually common ones, but I took, among others, six of those of *Stauropus fayi*, four *Jochæara alni*, six *Moma orion*. I also captured, on August 1st, several *Cenestra pilleriana*. I see that Stainton says "scarce," and "near Ventnor." Is this a new locality for it? At the same time, I took *Crambus latistrius* and *C. warringtonellus*.—W. J. Cross, Ely. November 11th, 1898.

LEPIDOPTERA AT HORNING.—Whilst staying at Horning during the last week of July I captured some interesting species; mostly at light. The weather was very bad and wet for collecting, otherwise the result might have been a better one. Among other species captured were the following: *Nudaria senex*, plentiful, flying in hundreds over a grass field and in grand condition; *Earias chlorana*, one only; *Lithosia muscerda*, going over; *L. griseola*, and its ab. *stramineola*; *Hepialus hectus*; *Gastropacha quercifolia*, several males, but only one female; *Cosmotriche potatoria*, *Notodonta ziczac*, *Cymatophora fluctuosa*, only one; *Cleoceris riminalis*, *Leucania straminea*, *L. impura*, and *L. pallens*, *Calamia phragmitidis*, only just appearing; *Coenobia rufa*, plentiful, some very nice forms; *Hydrelia umca*, *Cleora lichenaria*, *Geometra papilionaria*, *Hyria auroraria*, *Epione apiciaria*, *Acidalia bisetata*, *A. immutata*, swarming; *A. subsericeata*, *A. imitatoria*, *A. emarginata*, *Abraça grossulariata*, one beautiful aberration with hardly any markings was taken by Mr. Bowles; *Hypsipetes elutata*, *Cidaria testata*. Two days work at *Nonagria cannae* produced a fine lot of pupæ. Larvæ of *Papilio machaon* were fairly plentiful, whilst larvæ of *Taeniocampa gracilis* were taken on sallow.—H. M. EDELSTEN, The Elms, Forty Hill, Enfield.

LEPIDOPTERA NEAR REIGATE.—Between September 17th—24th last, at Kingswood, near Reigate, Surrey, I captured some recently emerged *Gonopteryx rhamni*, *Polyommatus bellargus*, *P. icarus*, in good condition, *Hydroecia micacea*, *Brstolomia meticulosa*, *Plusia gamma*, &c.—HUBERT C. PHILLIPS, M.R.C.S., F.E.S., 88, Shirland Gardens, Paddington, W.

LEPIDOPTERA OF NORTH WILTS.—The following is a list of the insects I captured at Calne, North Wilts:—PAPILIONIDES.—*Aglaia urticae*, *Vanessa io*, *Pyrameis atalanta*, *P. cardui*, *Pararge megera*, *Epinephele ianira*, *E. tithonus*, *Coenonympha pamphilus*, *Chrysophanus phlaeas*, *Gonopteryx rhamni*, *Euchloë cardamines*, *Pieris napi*, *P. rapae*, *P. brassicae*, all generally distributed; *Polyommatus astrarche*, *P. bellargus*, *P. corydon*, *Cupido minima*, local, but common where they occur; *Colias edusa*, common in some years. HESPERIDES.—*Nisoniades tages*, *Pamphila sylvanus*, locally common. SPHINGIDES.—*Smerinthus ocellatus*, *S. populi*, *S. tiliae*, *Sphinx ligustri*, *Macroglossa stellatarum*. HEPIALIDES.—*Hepialus lupulinus*, *H. humuli*. ANTHROCERIDES.—*Anthrocera filipendulae*. NOLIDES.—*Nola cristulalis*, one specimen only. ARCTIIDES.—*Nudaria mundana*, *Lithosia lurideola*, *L. griseola*, *Cenistis quadra*, *Euchelia jacobaeae*, *Arctia caia*, *Spilosoma lubricipeda*, *S. menthastri*, *Porthesia similis*, *Orgyia antiqua*. LASIOCAMPIDES.—*Poeciloscampa populi*, *Eriogaster lanestris*, *Malacosoma neustria*, *Cosmotriche potatoria*. NOTODONTIDES.—*Platypteryx hamula*, *P. unguicula*, *Cilix spinula*, *Cerura vinula*, *Petasia cassinea*, *Phalera bucephala*, *Ptilodontis palpina*, *Notodonta ziczac*, *Diloba caeruleocephala*. NOCTUIDES.—*Thyatira batis*, *Bryophila muralis*, *B. perla*, *Triaena psi*, *Leucania conigera*, *L.*

Litharyphria, *L. comma*, *L. impura*, *L. pallens*, *Hydroecia micacea*, *Axylia putris*, *Xylophasia rurea*, *X. lithoxylea*, *X. sublustis*, *X. polyodon*, *X. hepatica*, *Heliophobus popularis*, *Luperina testacea*, *Mamestra brassicae*, *Apamea basilinea*, *A. gemina*, *A. didyma*, *Miana strigilis*, *Grammesia trigrammica*, *Caradrina quadripunctata*, *Peridroma suffusa*, *P. saucia*, *Agrotis segetum*, *A. exclamationis*, *A. corticea*, *A. tritici*, *A. obscura*, *Triphaena janthina*, *T. orbona*, *T. pronuba*, *Graphiphora augur*, *Noctua plecta*, *N. c-nigrum*, *N. triangulum*, *N. rubi*, *N. umbrosa*, *N. baia*, *N. xanthographa*, *Taeniocampa gothica*, *T. incerta*, *T. stabilis*, *T. pulverulenta*, *Orthosia lota*, *O. macilenta*, *Anchocelis pistacina*, *A. litura*, *Orrhodia vaccinii*, *O. spadicea*, *Scopelosoma satellitia*, *Tiliacea citrago*, *Citria fulvago (cerago)*, *Mellinia circellaris*, *Cosmia trapezina*, *Calymnia diffrinis*, *Polia flavicincta*, *Epunda luteolenta*, *Miselia oxyacanthae*, *Agriopis aprilina*, *Brotolomia meticulosa*, *Euplexia lucipara*, *Aplecta nebulosa*, *A. adrena*, *Hadena protea*, *H. nana (dentina)*, *H. genistae*, *Xylocampa lithoriza*, *X. rhizolitha*, *Cucullia umbratica*, *Habrostola urticae*, *H. tripartita*, *Plusia chrysitis*, *P. iota*, *P. pulchrina*, *P. gamma*, *Gonoptera libatrix*, *Amphipyra pyramidea*, *A. tragopogonis*, *Naenia typica*, *Euchlidia mi*, *Phytometra riridaria*. GEOMETRIDES.—*Urapteryx sambucata*, *Epione apiciaria*, *Rumia luteolata*, *Metrocampa margaritaria*, *Eurymene dolobraria*, *Pericallia syringaria*, *Selenia bilunaria*, *Odontopera bidentata*, *C. elinguaris*, *Phigalia pedaria*, *Amphidasys prodromaria*, *A. betularia*, *Hemerophila abruptaria*, *Cleora lichenaria*, *Boarmia repandata*, *B. rhomboidaria*, *Iodis vernaria*, *I. lactearia*, *Phorodesma baiularia*, *Hemithea thymiaris*, *Asthena luteata*, *Acidalia aversata*, *Timandra amatoria*, *Cabera pusaria*, *C. exanthemaria*, *Halias rauaria*, *Fidonia pinaria*, *Abraxas grossulariata*, *Lomaspilis marginata*, *Hybernia progenimaria*, *H. defoliaria*, *Cheimatobia brumata*, *Oporabia dilutata*, *Larentia didymata*, *L. pectiniaria*, *Emmelesia affinitata*, *E. albulata*, *E. decolorata*, *Eupithecia oblongata (centaureata)*, *E. subfulvata*, *E. lariciata*, *E. vulgata*, *E. assimilata*, *E. rectangulata*, *Thera obeliscata*, *Hypsipetes furcata (elutata)*, *Melanthia bicolorata*, *M. ocellata*, *Melanippe rivata*, *M. subtristata*, *M. montanata*, *M. fluctuata*, *Anticlea derivata*, *Coremia designata*, *C. ferrugata*, *C. unidentaria*, *Camptogramma bilineata*, *Triphosa dubitata*, *Cidaria miata*, *C. immanata*, *C. testata*, *C. fulvata*, *C. pyraliata*, *C. dotata*, *Eubolia cervinata*, *E. limitata*, *E. bipunctata*, *Anaitis plagiata*.—(Rev.) T. B. EDDRUP, M.A.

CURRENT NOTES.

Commencing with the current number we propose to permanently enlarge *The Entomologist's Record and Journal of Variation* to 28 pages monthly. This will allow British lepidopterists their old proportion of space, and enable us to clear off articles that have been delayed owing to our inability to find room for them.

We regret to have to announce the death of Mr. W. A. Grover, late of Guildford, who whilst cleaning his gun was killed instantaneously by its explosion. The deceased gentleman was at the time in Brazil, on a journey up the river Amazon.

On January 3rd, Section F (the Entomological Section) of the Leicester Literary and Philosophical Society held a conversazione in the Museum, Leicester. The conversazione was the result of a compromise between the lady and gentlemen members of the section, the

former considering that they were entitled to this as an equivalent for the dinner which the gentlemen have constituted an annual institution. The *conversazione* was well attended by the members and their friends, a whole army of microscopes, under the care of Messrs. F. B. Jones, F. R. Rowley, W. A. Vice, and others, being on exhibition. Entomological specimens were exhibited by Professor Beare, Messrs. Bouskell, Burr, Dixon, Hall, Headly, Kaye, Rowley, and Vice. Miss Jones and Mr. Rowley had arranged an excellent selection of music. Mr. Tutt lectured on "Protective Resemblance and Mimicry in Insects," Mr. F. Rowley skilfully manipulating the lantern illustrations for the lecturer.

On the evening of January 4th, the members of Section F held their annual dinner at the Constitutional Club. The London guests were Professor T. Hudson Beare, Messrs. M. Burr, H. St. John K. Donisthorpe, W. J. Kaye, and J. W. Tutt. There was a wonderful "entomological" *menu*, prepared we believe by Messrs. Bouskell and Chalcraft. The London visitors were called upon to respond to the after dinner toasts, Professor Beare making, as usual, quite *the* speech of the evening. The Entomological Section certainly owes much to its excellent President and Secretary. Mr. Bouskell's energy seems unbounded, and each year's annual meeting appears to excel the preceding one.

The excellent condition and arrangement of the invertebrate sections of the Leicester Museum show everywhere the skilful manipulation and intelligent knowledge of an advanced scientific naturalist. The entomological cases are especially well arranged (they should, however, be in some measure protected from the light), and the mounting of the Crustacea and Coelenterates is beyond praise.

The seventh annual exhibition of the North London Natural History Society, held on December 31st and January 2nd last, proved a marked success in every way. There was a good attendance, and amongst the more prominent entomologists who were present as visitors, were noticed Mr. J. A. Clark, Dr. Sequeira, Mr. E. H. Conquest, and Mr. Arthur Horne, of Aberdeen.

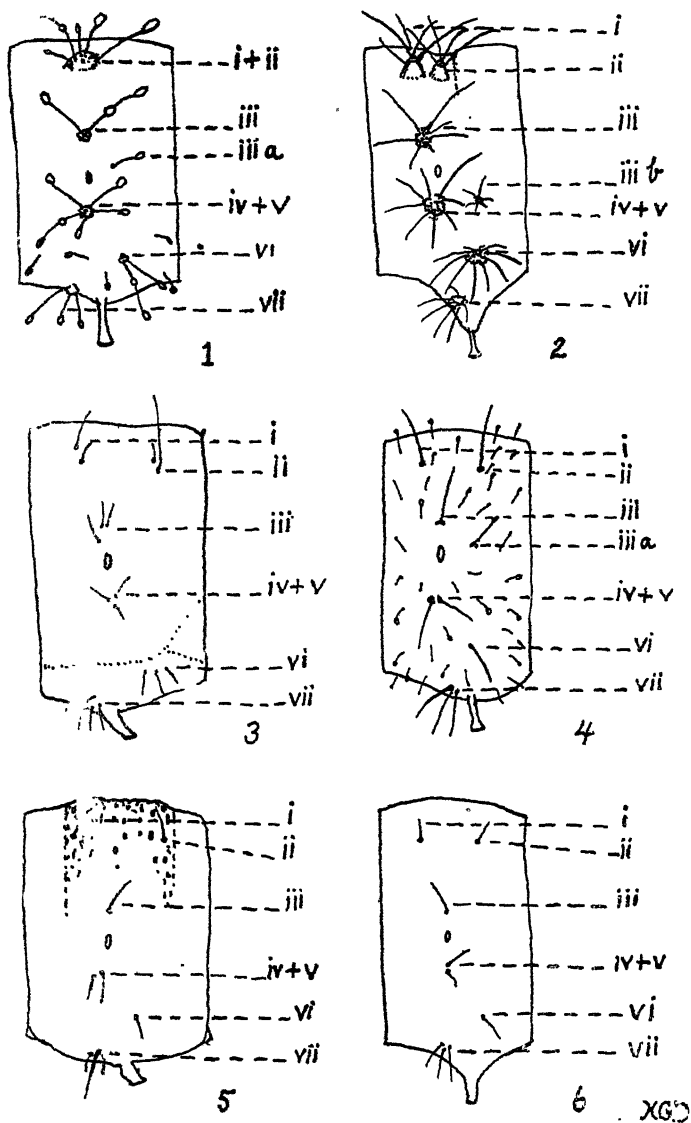
We understand that Mr. S. J. Capper, F.L.S., F.E.S., has again been re-elected President of the Lancashire and Cheshire Natural History Society. We offer our heartiest congratulations to the Society and its President.

REVIEWS AND NOTICES OF BOOKS.

BRITISH LEPIDOPTERA, By J. W. Tutt, F.E.S. [To be published by subscription, price 15s. to subscribers.] The names of the following ladies and gentlemen have been received since the publication of the list of the subscribers in *The Entomologist's Record*, vol. x., p.315:—

Right Hon. Earl Waldegrave, Lt.-Col. Linley Blathwayt, F.L.S., F.E.S., Capt. E. W. Brown, Rev. T. B. Eddrupp, M.A., Drs. J. Cotton, M.R.C.S., etc., D. Wright, F.R.C.S., F.E.S., Mrs. M. E. Cowl, Mrs. C. N. Pearson, Messrs. A. H. Clarke, F.E.S., A. Doncaster (6 copies), C. B. Headly, F.E.S., A. Heyne, W. Holland, J. H. A. Jenner, F.E.S., F. B. Jones, M.R.C.V.S., F. Lucock, K. J. Morton, F.E.S., W. G. Sheldon, J. Peed, T. Tunstall, H. J. Turner, F.E.S., Profs. T. Hudson Beare, B.Sc., Enzio Reuter, Ph.D., and "Nonpareil" Entom. Society.

Names of Subscribers to be sent to H. E. Page, F.E.S., "Bertrose," Gellatly Road, Hatcham, S.E.



TUBERCLES OF PTEROPHORID LARVAE.

The Entomologist's Record

AND

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Lepidoptera with a general inland distribution in Europe but confined to coast habitats in England.*

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

The fact that certain lepidoptera have a general inland distribution in Europe, but are confined to coast districts in England, is one that occasionally comes up for discussion, but has never yet been satisfactorily nor completely explained. I propose, therefore, to bring forward such facts as I can, bearing on the question, in the hope that it may lead to the matter being carried a little further, if not to the full elucidation of all debatable points. The question is—Why do not certain lepidoptera live inland with us as they do on the Continent? As a question of geographical distribution it is a minor one, and may in some degree be dealt with by itself, though being a particular case depending to a great extent on general principles, it may be desirable to refer to some facts and principles that are outside the question itself.

If we begin by asking why a particular species is found (or not found) in a particular locality, we shall find the answers may be sorted into two series corresponding to two aspects of the question of distribution. The first series comes under the form, because for some reason or other it was able (or unable) to reach that locality. These refer to the general question of distribution in great regions, in islands, &c., giving to each region its special fauna, such as the Palaearctic, Nearctic, &c. This aspect of the question is quite outside the present discussion, and all the answers we are in search of fall under the other series, and take the form that the species does (or does not) exist in that particular locality because having got there (or been able to get there) it found the circumstances of the locality were (or were not) suitable to it. What then, are the circumstances of our coast that render it suitable to the insects contemplated in this discussion, and which do not exist away from our coast, though they are to be found inland on the Continent? This apparently throws out of account the influence of sea air, a saline atmosphere, food-plants only found by the sea-shore, and so on. We shall see, however, that this element cannot altogether be left out of account, as it cannot be altogether separated from other elements which render it effective. There is also the fact that in England the coast line preserves some at least of the natural features

* Read to introduce discussion at the City of London Ent. Society, Jan. 3rd, 1899.

and normal vegetation of the country which have been entirely lost, or, from an insect's point of view, fatally modified by agricultural and other improvements over such a vast proportion of the inland area.

The climate of the coast differs decidedly from that of the adjacent inland districts, and does so in several particulars of great importance to insect life. As this seems to me to be the dominating influence amongst all the circumstances that we have to consider, it seems desirable to go into it more fully. A paper on English climatology in the *Quarterly Journal of the Royal Meteorological Society*, October, 1892, by F. C. Bayard, P.R.M.S., gives us some of the desired data. It discusses ten years' observations (1880-1891). For our purposes some other details might have been desirable, especially some digest of absolute maxima and minima, and of ranges of temperature, which probably have considerable bearing on our question. They would probably have brought out more strikingly some of the effective differences between the coast and inland. In regard to temperature, Mr. Bayard draws attention to two great facts, *viz.*, (*a*) (and this is the one that is of most importance to us) "the great influence of the sea and its tendency to increase the temperature of the sea-coast stations in winter and decrease it in summer"; (*b*) "that the temperature rises much more rapidly than it falls, that is to say, that the average rise in temperature between April and July is 12-17deg., whilst the average fall from July to October is only from 8 to 13deg., after October the temperature diminishes very rapidly." Mr. Bayard does not say so, but an inspection of his tables shows that this second fact is much more marked at the coast than at the inland stations. At inland continental stations the condition is reversed, *i.e.*, the fall is more rapid in the autumn, or, rather, the fall of temperature in the autumn takes place more largely before October, or, briefly, winter sets in earlier. In comparing our coast with our inland stations, we are noting the same differences that obtain between our insular climate and that of inland Continental stations, both as regards the early fall of temperature in the autumn and also in the difference between summer and winter temperatures. Our islands, as a whole, compare with the Continent in having a cool summer and a mild winter, just as our own coast compares with our own inland stations. These effects are more pronounced on the south and west coasts than on the east. We may analyse the south coast climate as compared with the inland into the following items:—

1.—The south coast is the most southern part of our island, and so tends to be warmer at all seasons.

2.—The actual coast (and it is the actual coast we are most concerned with), and often for some distance inland, is at sea level, and as temperature falls about 1deg. for each 300ft. of elevation, the more elevated interior must be colder.

3.—The equalising effect of the neighbouring mass of water, whose temperature tends to be more constant than that of the land, where practically only the surface has to be warmed and cooled; and as regards the raising the winter temperature, this water is warm water from the Gulf Stream.

4.—The air of the coast is drier than inland.

5.—The sea-coast stations are as a rule less cloudy than the inland ones.

Mr. Bayard says (with regard to 4): "We shall be struck with the fact that the percentage of relative humidity is lowest, comparatively,

at our sea-coast stations (with three exceptions)." This seems, at first view, paradoxical, but is really not so, if we reflect that each square yard of sea presents one square yard of evaporating surface; whilst on land, from its porosity and vegetable clothing, each square yard presents many square yards of evaporating surface, and often nearly as moist a one as that of the sea itself. The fourth and fifth items would lead to there being more frequent sunshine and to its being more effective at the coast stations. This, no doubt, will increase the mean annual temperature of these stations, but, except in this result, is not illustrated by Mr. Bayard's figures. As the freedom from cloud is very marked at our south coast stations in winter, as well as in summer, they would no doubt have longer and more frequent spells of sunshine, which, acting on initially warmer conditions, would give, especially in favoured corners, if not a summer temperature, at least one much above our English notions of winter, and this for a few hours or even a few days at a time.

I do not know that any figures precisely illustrating this point have been digested, and to do so would involve an immense amount of labour. The less striking, but more weighty, figures involved in averages show us on the south and west coasts that, whether we take minimum, mean, or maximum temperatures, the coast stations have an advantage during the winter of from 2deg.—4deg. F. I have extracted some figures to exemplify this, selecting as nearly comparable inland and coast stations as are afforded, giving in some the mean, in others the maximum and minimum figures:—

| | | Oct. | Nov. | Dec. | Jan. | Feb. | Mch. | April. |
|------------------|----------------------------------|------|------|------|------|------|------|--------|
| Mean Max. Temp. | Aspley Guise (inland, 400ft.) | 54.0 | 47.5 | 41.0 | 41.4 | 43.0 | 47.1 | 53.1 |
| | Lowestoft (coast, 85ft.) | 55.3 | 49.2 | 42.7 | 42.6 | 43.3 | 46.0 | 49.8 |
| Mean Temp. | Marlborough (inland, 471ft.) | 46.8 | 42.5 | 36.8 | 37.2 | 38.4 | 39.9 | 44.7 |
| | Ventnor (coast, 80ft.) | 52.1 | 47.8 | 42.3 | 41.6 | 41.9 | 43.1 | 47.4 |
| Mean Max. Temp. | Beddington (inland, 100ft.) | 55.2 | 49.2 | 42.4 | 42.8 | 43.9 | 48.1 | 54.1 |
| | Brighton (coast, 30ft.) | 56.8 | 51.8 | 45.8 | 44.8 | 44.9 | 47.6 | 52.3 |
| Mean. Min. Temp. | Burghill (inland, 274ft.) . . | 40.5 | 38.1 | 32.5 | 32.5 | 33.6 | 34.0 | 37.4 |
| | Carmarthen (est. appt., 188ft.) | 42.3 | 39.6 | 34.5 | 34.5 | 35.3 | 35.0 | 38.4 |
| Mean Temp. | Macclesfield (inland, 501ft.) | 46.3 | 42.2 | 36.6 | 36.9 | 37.8 | 39.0 | 44.0 |
| | Llandudno (coast, 88ft.) . . | 49.0 | 46.0 | 41.4 | 41.3 | 41.2 | 41.7 | 45.5 |

The weekly weather reports of the Meteorological Office give figures described as "day degrees above" (and below) 42deg. for the week for each station. I am not aware that these have been summarised in any way for each station or averages taken, and the labour of doing so would be great, so that I have not undertaken to do it. I have, for the sake of exemplifying the meaning of these figures, so far as they concern my present subject, made a comparison of these for the stations of Douglas and Cheadle, a coast station and an inland one at a little elevation. These figures are those of only one year, and, therefore, must not be taken as necessarily normal figures for either station, but they are nearly as trustworthy for comparison of the two stations as if they were averages of a long period. The coast station is a degree of

latitude further north, yet it has a total of 2,718 day degrees above 42deg., or, against 2,610 at Cheadle, nearly 4 per cent. more. The distribution of these is more important. In winter (November to March) they are : Douglas, 458, Cheadle, 315, or nearly 50 per cent. in favour of the seaside station. For the rest of the year (April to October) they are : Douglas, 2,255 ; Cheadle, 2,805, a substantial advantage in favour of Cheadle. Animal life might, then, be active during winter half as long again at Douglas as at Cheadle. There is, however, the further disadvantage to Cheadle that it has during the winter 564 day degrees under 42deg., whilst Douglas has only 247. Insects must, therefore, be so much more chilled at Cheadle as to be unable to make a fair use of their chances. At Cheadle there are fewer warm periods and less power to make use of them. There is another factor operating at many of our coast stations, both on the east and west, but especially on our south coasts, *viz.*, the ground has a steep slope facing south either as cliffs or downs, and often protected laterally from east and west winds by projecting downs, rocks, or headlands. This is, no doubt, most frequently the case on steep rocky shores where sundry nooks—small, no doubt, in extent—often have quite a summer climate for short periods during the winter. Though such places must intensify the effect of the general conditions, and must be taken into account, I have no figures to show numerically what they amount to, neither have I any definite information as to how far such favoured spots retain species that would otherwise perish, nor do I know to what extent the habitats, at the northern limits of species on the Continent, may be more or less such favoured spots. So that without forgetting that such intensifiers of the general effect exist, we must draw our conclusions from such averages as are available. The difference of climate making the south coast warmer by about 2deg. than inland would, no doubt, enable some insects to live there that would not survive inland. The further difference making the winter much milder is probably a more potent circumstance in maintaining certain species on the coast, so that it requires further examination. Broadly, the point is that the winter temperature of the coast is such as not to require the quiescence of hibernation that obtains inland.

I may first, however, note how these south coast temperatures compare with Continental temperatures. To make this more evident to the eye as well as the ear, I have roughly marked on an outline map of Europe three isotherms. The winter temperature of the south coast is about 42deg. This isotherm crosses the south-west of Ireland, runs along our south coast, crosses to France east of the Channel Islands, runs southwards, and, bending eastward in the south of France, runs east through North Italy. The summer isotherm of 60deg., which also runs near the south coast, instead of trending south after leaving us, runs north-east along the coast of Holland, through Denmark, takes a great bight northwards to beyond 60deg. N., into Scandinavia, and returning to the southern shore of the Baltic, follows it north-east to the neighbourhood of St. Petersburg. The mean annual temperature of 50deg., which corresponds very closely with the isotherm of the same temperature on about April 25th, runs along our south coast, passes eastward and slightly southerly, south of Brussels, north of Munich, very near Vienna, and thence fairly easterly. Our south coast, then, has a mean temperature, corresponding to 3deg. of latitude

further south in continental Europe, a winter temperature corresponding to 6deg. further south, and a summer temperature corresponding to a good deal further north, perhaps as much as 8deg. of latitude.

To return, however, to the action of the milder winter on insects hibernating. Hibernating larvæ, and *mutatis mutandis*, similar considerations apply to other stages, differ immensely in what one may call the intensity or earnestness of their hibernation. This is so even within the limits of one species, as I found in the case of *Arctia caia*, where one form of hibernating larva adhered to its hibernation, against the stimulus of a high temperature, for twice as long as the normal form did. Some species go into hibernation at a fixed date and remain for a certain period, and no increase of temperature will alter their programme, they will die at their posts first. Others, again, go into hibernation with very honest intentions, but any very considerable temperature will make them move on. Others, again, are easily disturbed, and one might almost say hibernate because they must, but would rather not. A very large proportion of our hibernating Noctuid larvæ belong to this section. They hide beneath a little soil or rubbish, sufficient to protect them from a slight frost, and are, therefore, able in any mild weather to come to the surface and do a little feeding, and, except in very severe weather, are subject to no cold enough to make them really torpid. It is well-known that there is no difficulty in making these larvæ feed up continuously and the moths emerge in January or February. At inland continental stations such larvæ, owing to the greater severity of the weather, are obliged really to hibernate, and from the beginning of winter, which there sets in as early as here, are rendered quite torpid, and even on a warm day are too chilled to be able to make any use of it. They consequently are, in spring, less forward than here, but easily make up lost time by the greater warmth of the summer. With us, by aid of the milder winter, they keep slightly active all the time, and so make our mild winter balance our cool summer in getting the cycle of their metamorphoses into the year.

We may now turn to actual species and see how far we can apply these various circumstances affecting the coast to explain their distribution. I may take first *Aporophyla australis*, since it is one of which I am quite sure as to my facts both as to life-history and distribution, and it illustrates the principal method of action of our mild south coast winter. *A. australis* occurs on our south coast, and again in quite southern France, and in the Mediterranean region; I should expect it to occur also in western France, but I am not aware of any records. It is quite absent in central and northern Europe. Its life-history, and it is the same in its southern as in its English habitats, is briefly—that the eggs are laid in September, the larvæ feed all winter and pupate at latest in May, remaining all through the summer in the pupal state. The question of a hot or cold summer is indifferent to it, but what is absolutely essential is a winter sufficiently mild to enable the larva to have little or no feeding up to do in spring. This is possible on the warm side of the winter isotherm of 42deg. or thereabouts. My map is a rough one, but the blue line I have drawn is not far out as the northern limit of *A. australis*, though it professes to be the winter isotherm of 42deg. Fahr. Another species that is probably

on all fours with *A. australis* is *Heliothobus hispidus*. The geographical distribution is not dissimilar to that of *A. australis*, and I believe its life-history is identical as regards passing the summer as a pupa.

Lithosia caniola emerges rather later in the year than most of our other Lithosias: I do not know whether it pupates earlier. It has a very southern distribution, not so much so as *A. australis*, as it approaches central Europe in its French distribution, but it does not occur in Germany, north of the Alps, and no doubt requires with us to make some progress during the winter, if not throughout its range.

Our three south coast Leucanias may be taken as giving a transition from these very southern types to the larger number of central European species that are confined to the south coast. *Leucania putrescens* appears to be a truly coast insect, and its English and French stations show that mild winters are essential to it. It, as well as *L. ritellina* and *L. albipuncta*, emerges later in the year than our inland Leucanias, possibly implying a longer stay in the pupal state. *L. putrescens* is controlled by the 42deg. F., winter isotherm; *L. ritellina* penetrates into colder Continental regions; whilst *L. albipuncta*, though requiring the winter for feeding in England, extends on the Continent to regions where this would be impossible, but is still a more southern insect than many species that do not in England get north of the south coast.

Though it is only in species like *A. australis* and *H. hispidus*, that, as it were, throw away the summer, that very southern species can maintain themselves with us, yet there is a large group of species that live in central Europe, where they have a much warmer summer than ours, during which they live much more rapidly than they can do with us, and which, therefore, can only live with us by making some progress in winter. These species, as regards habits, all, I think, pass the winter as larvæ, and the case of *A. australis* proves that larvæ can progress during the winter on the south coast. These species broadly, have the northern limit of their range about, or very little beyond, the mean isotherm of our south coast. I may note here, perhaps, as conveniently as anywhere that, of the species that appear to have climate as the chief or only factor governing their distribution, those that are confined to the south coast all pass the winter as larvæ, whilst those that pass the winter as pupæ have an inland distribution, the warmer inland summer being effective, the colder winter inoperative. These latter species approach the line of the summer isotherm to a greater extent as the northern limit of their distribution, but I have not studied them in detail.

(To be continued.)

Aberrations of *Anthrocera filipendulæ*.

Ry W. H. HARWOOD.

The locality where I obtain my pink and orange forms of *Anthrocera filipendulæ* is in north-east Essex, and within a few miles of Colchester. I was acquainted with it when I was a schoolboy, and the species was then fairly common, but I never saw or heard of any aberrations at that time. After a while its headquarters were utilised for building and gardening purposes, and, as no more specimens could be found, we considered for many years that the colony had entirely

disappeared. But in August, 1891, I came upon a piece of rough pasture, not very far from the old spot, which I thought ought to produce something, and there I found several *A. filipendulae* on thistle flowers, including a few curious pale forms. They were all, however, so much worn that I did not feel sure whether the pale ones had been pale originally, or whether they had become bleached by long exposure to the sunshine. The next year my sons went to look for larvæ and cocoons. They saw no larvæ, but when the summer was well advanced, found the cocoons in great numbers, and brought home about 100 of them. These produced at first only typical forms, but among the latest that emerged were two lovely pink specimens. Of course I was very soon on the ground myself after this, and found the species out in extreme abundance and the cocoons exposed in every direction. The variation among the specimens was very great. Many were dwarfs, the ab. *cytisi* was common, and large numbers had one or two pairs of spots confluent. Pink and orange forms were not uncommon, and were very conspicuous when on the wing or at rest on flowers. I picked out a fine series of these, and left all the worn ones, including many gravid females. Millions of eggs must have been laid that year, but in 1893 there was a great drought, and not a single cocoon or specimen could be found where they had been so abundant in 1892. By scouring the district thoroughly, I managed to find about a dozen cocoons elsewhere, and afterwards saw a few moths, including three or four pale forms. Since then the type has continued scarce, and the aberrations have been very rare, though in 1896 they seemed to be recovering their lost ground. Since then the property has changed hands and has been quite ruined from an entomological point of view. Part of it is now used for rearing poultry in large numbers, and the remainder is so closely fed and trampled down by cattle that the insect seems to have entirely forsaken it. Last summer I found about a dozen stragglers in a small pasture in the district, all being quite typical, and I now fear my chances of obtaining any more of the beautiful pink and orange forms have become very slender indeed.

It is to be noted that in 1892 the cocoons were abundant high up on culms of grass and in all manner of exposed situations. In later years very few were found so exposed, and the majority were hidden low down among the herbage close to the ground. The perfect insects occurred principally in July, none appeared in June, but they lasted well into August.

British species of butterflies at Wei-hai-wei.

By T. B. FLETCHER, F.E.S.

China is a country so little known that one cannot wonder it has been so neglected by the entomologist. Save a few collections from some of the treaty-ports, our knowledge of its entomology has scarcely increased since the time of Drury, now some 120 years ago. It may therefore be of interest to review some of the butterflies to be found at Wei-hai-wei, more especially those which have been familiar to us at home, or are the far eastern representatives of British species. During the past summer I have met with some 30 different species of butterflies at Wei-hai-wei, nearly all of which I have come across on the island of

Leu-kung-tao, but in the following notes I have confined myself to those which occur in Britain, or are related to British forms, since these are of most interest to readers at home:—

Papilio machaon.—Common in May and August, especially on the hill-tops. Here the vernal and æstival broods are quite distinct. Individuals of the former are typical, and indistinguishable from European examples; but the August specimens are much larger and darker, and seem intermediate between the type and the Japanese form *hippocrates*, Feld. *Colias hyale*.—The form found here seems to be the var. *poliographus*, Grun., which is almost identical with the English type, but of a darker shade of yellow. There is a rather scarce aberration of the female in which the yellow is replaced by white. The species is common from August to October. *Pieris rapae* is not common. The Wei-hai-wei specimens agree best with var. *orientalis*, Oberth. *Pieris daphidice*.—This is our commonest “white” throughout the summer. There seem to be two emergences, one in May and the other in August, but the species is to be found all through the warm season. The local form falls under var. *orientalis*, Brem., but seems scarcely distinguishable from European examples. *Coenonympha* sp. (? *amaryllis*).—Our little English *C. pamphilus* is forcibly recalled by this, its far eastern representative, which is, however, larger and more gaily marked. There are two broods, in June and August, in which months it is common in grassy places. *Pyrameis cardui* is exceedingly common at Wei-hai-wei, I might almost say all the year round. Freshly-emerged examples are to be found in July, whence they occur far into the autumn; and worn specimens, looking suspiciously as though they had hibernated, are common in April and May. *P. cardui* is also common throughout Korea and Japan.—*P. atalanta* var. *indica*, Herbst.—This, the *Tanessa callirrhoe* of Fabricius, differs from European *P. atalanta* principally in that the scarlet fascia across the forewings is broader and more irregular. It seems scarce at Wei-hai-wei, where I have only observed one specimen (June 18th, 1898); but it is generally common in Japan, where I have taken it at Nagasaki, Yokohama, and Hakodaté, and occurs as far south as Hongkong, though I have never myself seen it there. *Polygonia (Grapta)* sp.—A species, which at once by its tawny indented wings recalls the European *P. c-album*, occurs here in May, and probably in the autumn also. I cannot identify it with certainty, but I believe it to be *P. c-aureum*, L. *Argynnis adippe* occurs in abundance from June to September in splendid great forms almost unknown to the British collector. This is indeed a grand butterfly. I know few finer sights in nature than to see a dozen of these insects round a clump of thistles, and to watch them sail from flower to flower, now exhibiting their tawny velvet markings and now flashing their silver lustre in the sunshine. The specimens vary a good deal *inter se*, but seem to be mostly referable to var. *neriype*, Feld.; some of the females are very dark—indeed, they look quite black on the wing. *Thecla*, sp.—I have met with two different Theclid species on Leu-kung-tao, but only one appeals to British collectors by its similarity to a British form. This species, which I took on July 20th flying on a bare hill-top in the teeth of a stiff breeze, reminds one at once of *Zephyrus betulae* ♂, but it has much longer “tails” and the markings of the lower surface are rather different. *Chrysophanus phlaeas* is almost as common here as

it is at home. It varies much according to the time of the year. Many examples are large and comparatively light-coloured; I should think they could hardly be separated from a series of large British specimens. Those taken in June are small and much suffused with black, whilst those captured in September are large and dark. These two latter emergences both come under the head of var. *eleus*, Fab. Though, perhaps, it ought scarcely to be included amongst Wei-hai-wei butterflies, I must mention one strange aberration, taken on the Great Wall at Shan-hai-kwan on September 19th, 1898, which I believe must be referred to this species, as the markings seem quite typical. The ground-colour is of a very pale golden-yellow, and the usual black markings are irrorated with golden scales. The black spots on the forewings are very small, and the marginal band on the hindwings is much enlarged. Perhaps it is an intermediate form between the type and var. *schmidtii*, Gerh. *Ereres argiades*.—Common all the summer. The usual form seems referable to var. *amurensis*, Rühl, though the size varies greatly. This variety is characterised by a "very uniform whitish-grey underside. The pale red spots form a very distinct band on the hind wings of both sexes. . . ." Vernal examples have these spots paler than in those disclosed later in the season. *Cyaniris*, sp.—One female, taken on the mainland on June 18th, is a close ally of our *C. argiolus*. *Syrichthus*, sp.—I found this fairly common, though very local, amongst long grass on Leu-kung-tao in July. Superficially it resembles *S. malvae* (*alveolus*), but the white spots on the upper surface are fewer in number.

The foregoing must not be taken as a list of all the Wei-hai-wei butterflies; indeed, it only professes to treat of those which have representative forms at home, and takes no note of many species (such as *Jasoniades aethus*, *Niphandia fusca*, &c.) which would be unfamiliar to most British entomologists. Further, these are only the results of five months' collecting, so that next summer, if we are here, I shall probably be able to add still more species to this list, which even now comprises one-fifth of our British butterflies.

H.M.S. Centurion, at Wei-hai-wei, November 22nd, 1898.

Argyresthia conjugella, Zell., a new enemy to the apple fruit.

By ENZIO REUTER, Ph.D., F.E.S.

The damage caused to the apple crop by the larva of the common Codling-moth (*Trypeta pomonella*) is everywhere serious enough. Lately, however, another lepidopterous insect has appeared, which promises to be a still more formidable destroyer of this generally-cultivated fruit.

In the annual reports on the "Central Experimental Farms" for the years 1896 and 1897, the Canadian state entomologist, Mr. J. Fletcher, mentions a new apple pest, not previously noticed in America. The damage is caused by the attacks of a little caterpillar, somewhat resembling the true Codling-worm, but easily distinguishable from this by its much smaller size—only measuring a little over a quarter of an inch in length when full grown—and by the general form of its body, which is much more tapering towards each end. The habits of this larva, called by Mr. Fletcher "the apple fruit-miner," differ in some respects from those of *T. pomonella*.

The latter always works to the core and feeds upon the seeds, making only a single channel straight from the core to one side of the apple, and emerging through a rather large hole.

The former, on the other hand, injures the fruit of the apple in a very similar manner to that of the larva of *T. pomonella*, Walsh. The caterpillars under "consideration apparently enter the fruit from the side, and eat their way into the interior by tunnelling the fruit in all directions. They sometimes reach the core and feed on the apple pips, but more often keep to the more fleshy part of the fruit, which is thus entirely spoilt, as the passages made by these insects soon turn brown and start decay throughout the fruit. When fully grown the larva emerges at the side of the fruit," lowering itself to the ground before spinning up, and "makes a cocoon which in nature is probably placed in a crevice of the bark in the same way as that of the Codling-moth."

"The only sign that the fruit is infested at an early stage of its attack is by the exudation of juice from the fruit at the point where the insect entered, which generally dries up in the form of a little bubble; later, when the larva has left, the small hole in the side of the fruit through which it escapes can be readily seen on a close examination." "A point of entry is frequently marked by several small tunnels opening over the surface of a comparatively large area one-eighth of an inch to one-quarter of an inch in diameter, as if the insect had fed there for some time. With the growth of the fruit, this point becomes the centre of one of several—sometimes three or four¹ on a single apple—conspicuous depressions, by which the apples are much distorted; the blackened skin at the bottom of these depressions is also frequently further discoloured by a white deposit," consisting of the dried-up juice mentioned above.

A specimen of the fully-developed insect, hatched from pupa, was sent to Lord Walsingham, of Thetford, who determined it as *Argyresthia conjugella*, Zell., the larvæ of which in Europe feed in the fruits of the mountain-ash (*Sorbus aucuparia*), and sometimes also in those of the bird-cherry (*Prunus padus*).

This summer an apple pest, quite similar to that described above, was noticed in Finland, the apples in almost every orchard having been greatly injured by the tiny caterpillars, which often completely spoiled the apples for use.

Although I have not yet succeeded in breeding the perfect insect, owing to the circumstance that the imagines do not appear in the autumn but the following spring, there can be little doubt that these caterpillars are identical with those described by Mr. Fletcher.

The little moth, *Argyresthia conjugella*, is one of our commonest Tineids, its geographical distribution ranging over the greater part of Finland. Until now no injury to the apples has been recorded in Finland, nor, as far as I am aware, in other parts of Europe.

How are we to explain this sudden attack of an insect not previously known as an apple-fruit destroyer? As stated above, the caterpillars of *Argyresthia conjugella* ordinarily feed in the fruits of *Sorbus aucuparia*. In the years 1896 and 1897, especially in the latter one, there was in Finland an unusual abundance of mountain-ash berries.

¹ I have found as many as 70 on a single apple.—E. R.

Owing to this exceptionally favourable condition, the multiplication of the insect could proceed at an extraordinarily rapid rate. In 1898, therefore, the little moth appeared in great swarms.

Now the fructification of *Sorbus aucuparia*, and also that of *Prunus padus*, failed almost completely this season everywhere in Finland. Since the insect could not obtain its ordinary food, the egg-laying females instinctively went over to the apple trees. The apples offer plenty of nourishment, and while one mountain-ash berry ordinarily harbours only one caterpillar, several of them can find an abundance of food in a single apple. On account of this, many—I have found as many as 25 specimens in a single rather small apple—caterpillars are often to be found in the same fruit. From this fact, and considering the manner in which the caterpillars work, it will be evident that the injury caused by *Argyresthia conjugella* is much more destructive than that of the common Codling-moth, *Trypeta pomonella*, L.

[The change of food-plant here noticed is exceedingly interesting. We do not seem to have any records of the larvæ of *Argyresthia conjugella* feeding on apple in the British Islands. Apple, however, is a very possible food-plant for the members of this genus, and one British species, *Argyresthia currella*, is attached to this food-plant. I find that almost all the specimens of the latter species in my cabinet, were taken on the trunks of apple trees in Westcombe Park.—J. W. T.]

A Suggestion for the Pterophoridae. (Illustrated by Plate.)

By HARRISON G. DYAR, Ph.D.

The phylogeny of the *Pterophoridae* given by Mr. Meyrick (*Hand. Brit. Lep.*, p. 430) can be very easily tested by larval characters. The *Pterophoridae* have an excellent series of characters in their larvæ, but these have not been brought out in their various descriptions. I can only suggest to students of British larvæ to prepare full descriptions of all the species in accordance with the suggestions here given, especially of the genera *Psephenophorus*, *Stenoptilia*, and *Aglitis*. *Oxyptilus* has the same structure as *Trichoptilus*, and I have not made a figure of it on the plate.

In America only about 26 per cent. of the *Pterophoridae* are known in the larval stage, and as it will probably be long before many are found, it seems that this problem can be solved more quickly in England.

Below are the principal characters to be noted, given in tabular form:—

I.—Warts present—hair tufts instead of single tubercles.

1.—Secondary (i.e., single, scattered) hairs also present.

Warts i and ii united Type 1, Pl. I., Fig. 1.

2.—No secondary hairs, though small secondary warts (iii a, iii b, or both iii a and iii b) may be present.

a.—Warts functional Type 2, Pl. I., Fig. 2.

b.—Warts degenerate Type 2, Pl. I., Fig. 3.

II.—Warts absent—primary hairs single.

1.—Secondary hairs present, iii a sometimes more distinct than the others Type 3, Pl. I., Fig. 4.

2.—No secondary hairs, all tubercles primary Type 4, Pl. I., Figs. 5, 6.

It is probably unnecessary to add that Type 1 is the highest, and Type 4, the lowest, in degree of specialisation.

EXPLANATION OF PLATE I.

- Fig. 1.—*Trichoptilus lobidactyla*, lateral view of abdominal segment of larva.
 Fig. 2.—*Atucita lithodactyla* " "
 Fig. 3.—*Pterophorus kellicottii* " "
 Fig. 4.—*Platyptilia rhododactyla* " "
 Fig. 5.—*Marasmarcha microdactyla* " "
 Fig. 6.—*Orneodes hezadactyla* " "

Observations on the genus *Catocala*: *C. promissa*, &c.

By E. M. DADD.

(Concluded from p. 13.)

C. promissa.—Ova rather irregular, oval, rather more depressed than usual, micropyle very small, composed of only one or sometimes two rows of cells, a lateral rib running immediately round the micropylar area and another larger one outside this, to which are joined the vertical ribs. The latter are very coarse and irregular, and are crossed by one or two, similarly irregular, lateral ribs, the whole forming a coarse network. The vertical ribs number about 18. The surface between these ribs is granular and apparently pitted, these pits swell out as the larva matures. The egg measures .05in.-.0525in., and is considerably larger than that of any of the others.

The larvæ emerged at the commencement of April, and fed on oak-buds. The head and body are black, the segmental divisions of the first, second, third, and fourth abdominal segments being pale bluish-green. The prolegs are, as usual, only developed on the fifth, sixth, and last abdominals. The larvæ measure about .25in. One larva moulted for the first time on April 16th. It then measured .5in. The head is dull black, somewhat broader than the remainder of the body. The ground colour is soft grey, somewhat lighter between the segments. The four transverse rings are very much reduced, and are entirely effaced on the back. There are numerous fine dark lateral lines running the whole length of the larva. The tubercles are black and prominent, those on the eighth abdominal are very much enlarged, forming a ridge pointing backwards. Beneath, it is pearly grey, with a purple-brown spot on each segment. In the third instar it measures from .75in.-1in., is smoky-grey, with a white horseshoe mark on the first abdominal, the points towards the anus. The tubercles are not so large as in the former instar, the hump slightly developed on the fifth abdominal. The fourth instar much resembles the last. The head is bilobed, deeply notched between the lobes, black with white markings. There is a white band on the fourth abdominal in addition to the white horseshoe mark on the first. The hump on the fifth abdominal is now well-developed and smoky-black in colour, this colour forming a band across the segment and ending between the prolegs of the fifth and sixth abdominals. The sixth abdominal has a pale transverse ring, which, with the white band on the fourth, serves to emphasise the black ring on the fifth. The prolegs are now all fully developed, but vary in size, the third and fourth abdominal prolegs being smaller than the fifth and sixth, the fifth being the largest. The tubercles are now yellow-brown, the laterals very small. The lateral fringe is partially developed. In the last instar the larva measures quite two inches. The head is pale yellow-brown, with paler blotches on the lobes and a

black streak on each lobe. The whole is traversed with fine black lines. The ground-colour of the body is greenish-grey, the whole being beautifully mottled with white and grey, particularly the horseshoe mark on the first abdominal, which is now very large. Each segment has traces of similar marks, but in all except the second abdominal, which has a patch of white on each side, the ends of the horseshoe mark, they are only slightly lighter than the ground-colour. The hump on the fifth abdominal is of the same colour as the rest of the body, there being just a trace of the smoky colour immediately behind it. The tubercles on the thoracic segments are small and pink, the anterior dorsals on the abdominal segments are small and pink like the thoracic, the posterior are much larger and redder, those on the eighth being very large and forming a ridge, the posteriors on the ninth also incline this way but are much smaller, the laterals are small and pink. All are very prominent, and stand out like warts from the skin. The spiracles are jet black, and are well developed on the first thoracic and abdominal segments. The legs are grey, tipped with black at the joints, the prolegs also grey. The lateral fringe is pink and well-developed. Beneath, the larva is bluish-white, with a round crimson spot on each segment, the segments bearing prolegs having them larger than the rest. Two larvæ, when full-fed, I put in a bag of tissue paper, and they immediately closed all apertures with silk and changed to pupæ measuring just under an inch. The pupa is identical with the others, but is, perhaps, somewhat sligher in build.

The imago measures about two inches in expanse. The head and forewings are smoky yellow-grey, much suffused with white and with numerous black zigzag transverse bands. The hindwings are crimson, the marginal band very broad, tapering to the anal angle with a deep indentation just above the latter. The inner band is very narrow, and ends abruptly in the wing area. It is somewhat wavy. Beneath, *C. promissa* is very characteristic; the two outer bands of the upper wings are regular and not angled as in the *C. nupta* group, and in the latter respect they resemble *C. concumbens*. The outer band does not touch the hind margin as in the former, but meets the anal angle as in the latter. On the hind wings, however, it resembles *C. sponsa*, the inner margin of the outer band being more irregular. The half-moon spot is also developed.

C. flavini.—Ova round, flattened beneath and on the micropylar area, rather small in comparison with the perfect insect, it measures about .04in.-.0425in. The vertical ribs rather indistinct, varying from 28 to 30, the lateral ribs rather far apart, only a portion of the vertical ribs reach the micropyle. The micropyle itself is composed of several rings of cells, the inner ones being small and round, the outer larger and of no particular shape. The colour is red-brown or chocolate-brown with a yellow ring, the micropyle pink.

The young larva is very long and slender, the head pale yellow, the body of the same tint, with several dark grey transverse rings on the third, fourth, fifth, and sixth abdominals, legs yellow. The prolegs are fully developed on the fifth, sixth, and last abdominals only; there is no trace of the hump on the fifth abdominal; the tubercles are small and black. The larva in the second instar has the ground colour pale greenish-grey, with narrow wavy longitudinal grey lines. The head and legs grey. The prolegs on the third and fourth abdominals are

partially developed, but are apparently not used for walking. All the tubercles are very large and prominent, shiny black, and give the larva a very spotted appearance. In the third instar the colour is pale yellowish-grey, the whole surface being dusted with minute black spots. The fifth abdominal has a small black horseshoe mark where the hump should be, but there is very little trace of the latter except that the segment is somewhat swollen on the top. The head, legs, and prolegs are all grey. The tubercles are very small and scarcely perceptible. The lateral fringe is slightly developed. In the fourth instar the ground colour is of a greenish yellow-grey tint, the whole being sprinkled with minute black dots, as in *C. nupta*, *C. electa*, etc. The fifth abdominal still has the black horseshoe mark, but very little trace of a hump. The head is yellow, with a red spot on the top of each lobe, a black streak down each side, tapering to the mouth, and several black lines on the face. The legs and prolegs are pinkish-brown. The tubercles are very inconspicuous, pale yellow, the posterior trapezoidals of the eighth and ninth abdominals being somewhat larger. Beneath, the larva is pale greenish-grey, only the third and fourth abdominals having small spots, though one or two other segments have a slight trace of them. In the fifth instar the larva measures from 2.5—3in. The head and legs are pinkish-yellow, the head having a dark coloured streak on the top of each lobe; these thin out down the face; it is also much suffused with faint black lines. The ground-colour of the body is yellowish-grey, dusted with minute black and brown spots; these latter are, however, not as prominent as they are in *C. nupta* and *C. electa*. The fifth abdominal has a black transverse band, the points of which touch the prolegs on the fifth abdominal. The hump is small and black. The tubercles are all pale yellow, the trapezoidals being somewhat larger. On the eighth abdominal the posteriors form a ridge, which has a black blotch at the rear of it, and there are also traces of the streaks observed in *C. electa* and *C. nupta*. The spiracles are well-developed on the first thoracic and abdominal segments, grey in colour, that on the first thoracic, however, being twice as large as the rest, and surrounded by a ring of white. The prolegs are yellow, tinged with purple at the tip. The lateral fringe is pink, and well-developed. Beneath, the larva is greenish-white, with just a trace of pink; the spots are well-developed on the third to seventh abdominals and slightly on the third thoracic. When full fed the larva spins a cocoon similar to that spun by its allies, amongst the leaves of its foodplant but both my larvæ died whilst pupating.

The imago measures 2.5—3in. in expanse. The forewings, head, and thorax are pale whitish-grey, a great deal dusted with black scales, and with numerous indistinct, smoky, irregular bands crossing the wings. The transverse bars on each side of the orbicular are yellow and much indented, with a black edge on the orbicular side. The orbicular itself is black, surrounded by a yellowish, irregular ring, which in its turn is surrounded by black, whilst just beneath it is a pale yellow, oval spot, surrounded by a smoky ring. The hindwings are, however, the special feature of *C. fraaii*, the ground colour being lilac-blue; this is, however, confined to a narrow band in the centre of the wing, the outer band being very broad and regular, tapering slightly towards the anal angle, whilst the inner band has extended

itself over the whole base of the wing. The fringe is white, and this colour has encroached somewhat on the outer margin of the outer band. Beneath, the ground-colour of *C. fraxini* is almost pure white. The bands are similar to the *C. concubens* type on the forewings, the outer band not being angled, and reaching the inner margin at the anal angle; the white band between the outer and central bands is, however, much broader than in *C. concubens*, and the central black band slopes more towards the anal angle. On the hindwings, as in *C. concubens*, the outer band is much encroached on by the colour of the fringe; near the tip, as in the latter species, it is very much suffused with white. The inner band is very narrow, the margins being somewhat ragged. The black discoidal spot is well developed.

C. relicta.—The ovum is flat beneath, somewhat flattened on the top. It measures .045in.-.05in. The vertical ribs number about 30, and are somewhat irregular. The lateral ribs rather large. The colour is reddish-brown. The egg very much resembles that of *C. fraxini*. In the first two instars the larva also very much resembles that of *C. fraxini*, and I took no further description. In the third instar it also resembles *C. fraxini* of corresponding age, the ground-colour is, however, slightly more pinkish. The hump, though small, is somewhat more developed than in the latter at this stage, reddish, surrounded with a black ring. The tubercles are black, but very small and indistinct, those on the eighth abdominal forming the usual ridge, which is black. It also has the streaks developed. Beneath, the larva is bluish-white, with the spots developed slightly on the third and fourth abdominals and thoracic segments. It thus agrees with *C. fraxini* in everything except the slightly pinkish ground-colour and the hump. The larvæ described died in this instar.

The imago very much resembles *C. fraxini* in having only a narrow band of the ground-colour on the hindwings, but in this species the lilac-blue tinge has been almost lost, and the band is nearly white.

Migration and Dispersal of Insects: Orthoptera.

By J. W. TUTT, F.E.S.

(Continued from p. 18.)

One of the most formidable and destructive locusts is *Schistocerca gregaria*, so long known as *Acridium peregrinum*, a species to which reference has already been made. It is probably the locust that is mentioned in the book Exodus as causing one of the plagues of Egypt; it is also the chief locust found in north-west India. The species is almost unknown in Europe, although in October, 1869, a number of examples were captured in various parts of south-west England and the south of Ireland. The visitors were also recorded from Waterford, Warwickshire, Worcestershire, Derbyshire, Staffordshire, and Nottingham. Strange to say, no specimens were observed elsewhere in Britain nor on the continent of Europe. It is difficult to determine the direction in which these locusts were migrating, for, had they come from Africa to our western and southern shores, one would have expected records of their occurrence in Spain or France. It is, perhaps, more reasonable to suppose that they were migrating out to

sea over the Atlantic, and that contrary winds drove them back, a few only of the swarm reaching our shores.

It may be well here to refer to a paper by Mr. Roebuck, entitled "Locusts in Yorkshire" (*Naturalist*, 1876). From this we learn that locusts were recorded under the name of *Locusta christii*, Curt. (supposed by McLachlan to be *Pachytylus migratorius*), from Yorkshire, Derby, Stafford, Chesterfield, and Burton-on-Trent, in September, 1842, the greater number of examples being noticed, however, in the Holderness district. In September, 1846, a much greater flight was recorded, the whole coast between the Humber and Tweed having been the scene of the inroad of the locusts, whilst a cloud of them was reported to have settled temporarily near Spurn Point. Besides those reported from Northumberland, Durham, and Yorkshire, examples were observed in Lincolnshire, Norfolk, Essex, Kent, the London district, Cambridge, Rutland, Leicester, Nottingham, Worcester, Glamorgan, the Isle of Wight, Devon, and Cornwall. The more western and south-western records were chiefly of single examples, and there is little doubt that the swarm struck the east coast and was distributed therefrom. There is some doubt as to what the species really was. It was generally reported as *Gryllus* (*Pachytylus*) *migratorius*, and it is worthy of note that in 1844 this species was abundant in southern Russia, and from 1845-1847 occurred in northern Germany, Belgium, and Sweden. It is essentially an eastern species, appearing in the west of Europe only as an immigrant, but possibly being able to reproduce itself for a year or two under favourable conditions. Probably this was the case in Britain in 1847, for the same insect was recorded from many of the eastern counties, although Rudd's note that on August 19th he picked up on the beach at Redcar twelve drowned locusts and saw many others in the same state, suggests that another immigration may have occurred. The next important invasion appears to have been in August, 1857, when large numbers were recorded from Yorkshire and other eastern counties, with a smaller number from Scotland, Ireland, and the west of England (*Ent. Weekly Int.*, iii., p. 9). We have already referred to the visitation of our western counties by *Schistocerca peregrina* in 1869, but during the autumn of the same year an invasion of the east coast of Aberdeen by *Pachytylus cinerascens* is recorded, the main flight having been observed about Aberdeen. In 1876 a considerable number of specimens of *Pachytylus cinerascens* was recorded from Yorkshire. As these were carefully named by McLachlan and Sélys, the suggestion occurs that many of the earlier (and rather carelessly made) records may also refer to this species, although most of them are noted as *P. migratorius*. It is the opinion of Sélys that *P. cinerascens* breeds regularly in Britain (as it is reported to do in Belgium), but the absence of immature specimens in this country is against the supposition. As with certain Lepidoptera, it is possible that immigrating swarms of certain Orthoptera having reached Britain, a few stragglers survive the climatic conditions of a single winter and breed here, the unsuitable environment, however, preventing the species from maintaining themselves.

To return to *Schistocerca peregrina*. Enormous flights of this species have frequently been observed off the coasts of Asia and Africa. Their dead bodies have often been washed up in such vast quantities that banks several feet in depth have been formed along the shores.

This species also is especially troublesome in some years in Mesopotamia, where it usually occurs in April, the swarms appearing to come from the south-east, probably having their origin in southern Persia or Beloochistan, or even still further east. Terrible damage was done in Madras in 1878 and in the Deccan in 1882-83 by the same species of locust, and north-west India suffered heavily from another attack that took place in 1889. As is well known, the French Government has taken considerable pains to cope with the locust plague in Algeria. Great swarms of locusts, sufficiently numerous to darken the sun in many places, appear to come from the edge of the Sahara, or even across the Sahara from the Niger valley, whence clouds are frequently reported.

Writing of the invasions of Algeria by *Schistocerca peregrina*, Finot says that this species arrives in the south of Algeria, in the adult stage, in early spring (from February to May). The swarms come from the Sahara, and are generally brought by the sirocco or southern wind. Most probably they come from certain parts of the Soudan, where drought has prematurely destroyed their natural food. It has been observed in Algeria that the immigrating swarms fly only by day, settling before sunset, continuing their journey the following morning, and so on, until they reach a favourable place for settlement or occupation, choosing as a rule localities that are warm and rather humid. Here they lay their eggs, the period of oviposition lasting about twelve days. The eggs of the earliest swarms hatch from about April 15th-May 15th, and, when the hatching period is completed, the young ones move off in swarms of many millions, spreading out during the day for food, and collecting together again at night. They now set off on their walking tour towards the north, following this direction with amazing constancy, and turned aside only by the greatest obstacles. During the first days of this movement they only travel a few hundred mètres a day; about the 15th day, however, they complete quite a kilomètre, and, after 35 days, when they have almost reached the adult stage, they travel from four to five kilomètres per day. On the average, dependent on food and weather, such a body of wingless locusts travels from 30-50 kilomètres. As the young ones become stronger, the front of the column is considerably increased; sometimes, however, the mass is divided into many parallel marching columns. The depth of a swarm often amounts to a league. About 40 days after the hatching period the insects reach the adult stage. Their depredations now become much more serious, as their powerful wings help them to overcome obstacles previously impassable, and at this time of the year, towards the end of July, herbaceous vegetation is becoming dried up and rare. Spreading out each day for food, they return at night to a common ground, until the stragglers have completed their last moult. Food being scarce, they now fly high up into the air, and, after wheeling round, appear to take their flight towards the south.

Many authors have dealt with the migration of this species more or less minutely, e.g., Künckel d'Herculais, Lestage, Burr, &c., but the details are too extensive to be more than noted here.

COLEOPTERA.

COLEOPTERA IN THE HASTINGS DISTRICT.— During the past season

I have met with the following species in the Hastings district:—*Anitys rubens*, a nice series, bred from rotten oak at Guestling. This is the first time I have ever seen this species alive, although I have taken dead specimens on two or three previous occasions. From the same tree I got a large and variable series of *Mycetophagus piceus*, a species which has only once previously been recorded from the district. *Gyrophæna lucidula* and *Euplectus ambiguus* were taken not rarely by shaking rubbish round an old pond, and a nice lot of *Anchomenus livens* under dead leaves by the side of a small stream. *Scydmaenus exilis* (2) was also met with at Guestling under rotten oak bark, accompanied by a specimen or two of *Thymalus limbatus*. At Winchelsea, *Diphyllus lunatus* occurred in plenty in black fungi on ash, and at the ditches in the same locality, *Badister peltatus*, and *B. unipustulatus*, *Panagæus crux-major*, *Oodes heloptoides*, *Bagous subcarinatus*, *Telmatophilus sparganii* (in numbers), *T. brevicollis* and *T. schönherri*. *Stenus fornicatus* turned up very sparingly at Netherfield, as did also *Ocyusa maura*. One or two trips made to Lydd yielded *Stenolophus skrimshirani*, *Badister peltatus*, and *unipustulatus*, these last two not uncommonly, *Acupalpus consputus*, common, *Philonthus fumarius*, and *Ocyusa maura*.—W. H. BENNETT, F.E.S., 15, Wellington Place, Hastings.

COLEOPTERA IN THE NEW FOREST.—In early June I paid a short visit to the New Forest. The weather was very unfavourable for collecting, being cold and wet. There were a few warm days, however, and although the hawthorn blossom was nearly over, persistent beating over a wide area yielded a few good beetles, among the best being *Elater pomonæ*, 4, *Corymbites metallicus*, 12, *C. holosericeus*, common, *C. tessellatus*, 1, and *C. bipustulatus*, 1. *Haplocnemis nigricornis* was represented by a single specimen, as was also *Dasytes niger*, *Rhynchites betulae*, and *Tillus elongatus*. *Elater elongatulus* was picked off the coat of my companion, and *Tachinus elongatus* from a frond of bracken. Among the Longi-corns, *Callidium variabile* occurred pretty freely under oak bark, but most of these were in the pupal state. *Anoplodera 6-guttata* was met with in various blossoms, and all four species of *Grammoptera* occurred on hawthorn blossoms. An old oak trunk yielded *Tillus elongatus* ♂ and ♀, *Melasis buprestoides*, and *Lissodema 4-pustulata*, while from a beech *Mycetochares bipustulata* and *Tiresias serra* were taken. Two pupæ of *Athous rhombeus* were taken, one from oak, and one from birch, but only one perfect insect was bred. Powdery fungi on old timber yielded *Conipora orbiculata*, *Liodes orbiculata*, *Amphicyllis globus*, and *Agathidium rotundatum*.—IBID.

COLEOPTERA IN THE NEW FOREST IN AUGUST.—Having had a week's holiday at Brockenhurst—from August 15th to 22nd—I give the results as possibly of interest to coleopterists. The weather was exceptionally fine and the heat simply overpowering, and as there had been no rain to speak of for a long time, collecting was very hard work and insects scarce. I confined my operations almost entirely to searching during the day and sweeping during the evening. Some old beech logs near Ramnor were productive of *Homalota immersa*, *Euplectus bicolor* (the specimen pale testaceous), *Lathridius testaceus*, *Silvanus unidentatus*, *Ditoma crenata*, *Orchesia minor*, *Rhinosimus viridipennis*, and a specimen of *Choragus shepperdi* which I very nearly lost owing to my forgetting its jumping propensities. An old oak log in Holland's Wood contained *Athous rhombeus* (dead), *Ischnoglossa corticina*, and the

pupa of a Longicorn, which proved to be only *Rhagium inquisitor*. Fungus of all kinds was conspicuous by its absence, owing, doubtless, to the dry season; but from the few pieces I did find I got *Pocadius ferrugineus*, *Triphyllus punctatus*, *Necrophorus mortuorum*, *Cis nitidus*, and *Thymalus limbatus*. (The appearance of this last insect when taken is just as if it were dead and mouldy, a point which has been noticed by others.) I came across one oak in Holland Wood, from which the sap was flowing out, that yielded a long series of *Homalota cinnamomea* and two *H. hospita*, but none of the other sap-frequenting species; in fact, the only other occupants were three hornets. I spent one blazing hot day stirring up the gravelly bed of the stream that runs through Rhinefields, and secured a series of *Paracymus nigroaeneus*, *Hydroporus memnonius*, a very variable series of *Hydraena nigita*, and *Homalota currax*; *Geotrupes vernalis* turned up close by. All my other captures were taken by sweeping between six and eight o'clock in the evening, and that was the most productive method of taking the rarer Coleoptera. Poundhill enclosure yielded by this method *Mycetoporus clavicornis*, *Triarthron maerkeli*, *Anisotoma grandis*, *A. nigrita*, *A. dubia*, *Liodes orbicularis*, *Cryphalus fagi*, *Phyllobrotica 4-maculata*, and *Cassida sanguinolenta*. Near Ramnor Bog enclosure I swept *Telmatophilus typhae*, *Ceuthorhynchideus melanarius*, *Phytobius waltoni*, and *P. 4-nodosus*, *Thyamis holsaticus*, *Coeliodes ruber*, &c.; and along the Beaulieu Road I swept *Sitones waterhousei*, and (three) *Corticaria cylindrica*. *Orchestes iota* was common all round Brockenhurst on the *Myrica gale*.—H. HEASLER, 50, Aytoun Road, Brixton.

COLEOPTERA FROM EAST DORSET.—In an early number of the last volume of the *Entomologist's Record* appeared a list of coleoptera taken whilst on a short visit to east Dorset at the end of 1897. Since then I have, through the kindness of Miss Burgess, of Ferndown House, been the recipient of occasional small consignments of beetles taken for the most part in and about her garden, and am thus able to supplement my former Ferndown list by a few additional names. Amongst the Geodephaga received were one or two *Harpalus sabulicola*, which beetle appears to be not uncommon in the neighbourhood, whilst *Clivina collaris* occurred freely in cucumber frames in May. Of the Staphylinidae, *Leistotrophus nebulosus* and *Lathrobium multipunctum* were, perhaps, the best, but of other Clavicorns there were good series of *Necrophorus vestigator* and *Nitidula rufipes*, both scarce species; *Necrophorus mortuorum*, *Choleva nigricans*, and *Attagenus pellio*, the latter from outhouses being also present. The Lamellicornia were well represented both in size by some very fine specimens of *Lucanus cervus*, and in quantity by long series of *Geotrupes typhaeus*, *G. mutator* and *Heptaaulacus testudinarius*, the three last-named taken by Mr. Cecil Strood. With regard to the habits of *Heptaaulacus testudinarius*, an extract from a note sent by me to the *Entomologist's Monthly Magazine*, May, 1898, at the time of their receipt may prove of interest. In reply to a question on the subject, Mr. Strood wrote me that "during January and February they were only to be met with in the dung quite at the bottom of the *Geotrupes* (i.e., *G. mutator*) holes, but towards the latter part of March they 'simply swarmed' in the cowdung on the top of the ground." Another very desirable chafer was *Aphodius constans*, of which a short series was taken by Miss Burgess early in April. Although usually considered a very local and somewhat rare insect, this beetle

appears to have a wide distribution. *Onthophagus fracticornis* and *Serica brunnea* occurred sparingly, whilst the very local *Rhizotrogus solstitialis* was abundant in July, much to the delight of the poultry, which fed upon them in numbers! Amongst the Serricornia were two of the beautiful *Thanasimus formicarius* taken on different occasions crawling on a garden path in June. *Necrobia rufipes* and *violacea*, *Melasma populi*, *Chrysomela hyperici*, and *Psylliodes picina* were also represented, whilst the few weevils sent included *Rhinoncus castor*, *Sibinia potentillae*, and *Gronops lunatus*.—E. J. BURGESS-SOPP, F.E.S., Saxholme, Hoylake.

ORTHOPTERA.

Mimicry in Orthoptera.

By MALCOLM BURR, F.Z.S., F.E.S.

Very little is known of mimicry in Orthoptera, there being practically no data or observations on the living insects upon which to base generalisations. The species in which mimicry may occur are only known as dried cabinet specimens, so care must be taken to distinguish mere accidental resemblance or analogy from true cases of mimicry.

In the *Forficularia* we have the tiny earwig, *Labia minor*, L., which bears so striking a resemblance, in appearance and habits, to some *Staphylinidae*, that Linnaeus, and certain early authors, included them in the Coleoptera. It is frequently taken on June evenings, flying over flower beds and dung heaps in company with Brachelytrous beetles, but it is difficult to say whether the earwig gains any advantage from this association, any more than the rove-beetles may be favoured, and without independent or mutual advantage, the essential character of mimicry is lacking. Observations bearing on this point would be full of interest. *Labia* is a heterogeneous group, containing about 40 species, distributed all over the world, nearly all very small in size, and bearing the same general resemblance to *Staphylinidae*.

In the *Blattodea* we have also a few instances. Certain immature specimens, and wingless forms, especially the smaller species of *Perisphaeridae*, showed a marked superficial resemblance to certain *Isopoda*. This is well shown in Brunner's figure of *Pseudoglomeris formicata* ♀ (reproduced by Dr. Sharp in the "Cambridge Natural History"), which resembles the *Glomeridae*, small Myriapods. According to Brunner, the wingless *Derocalymma* roll themselves into a ball like wood-lice, and their habits are more or less similar. The common south European *Loboptera decipiens* is also very like a wood-louse. Sharp has noticed that certain small species, notably of the genus *Holocompsa*, have the appearance of *Capsidae*, and such brightly-coloured cockroaches as *Hymnoma amaena*, Sauss., *Corydia petiveriana*, and *Phoraspis*, Serv., might be mistaken for beetles. From the above remarks it will be seen that we can only note the resemblances of dried specimens, and are totally without necessary observations of their bionomics.

The *Mantodea* and *Phasmodea* are so strikingly modified by adaptation to their surroundings, the former for aggressive, the latter for protective, purposes, that we should be justified in expecting to find good cases of Mimicry among them. But our search brings dis-

appointment. The delicately winged *Ameles*, *Iridopteryx*, and others, are very like *Mantissa*, but we cannot tell which mimics which, or whether, as is more probable, it is a case of parallel development. Sharp quotes a case of a *Mantis* resembling a Phasmid (*Bacillus*?), with short anterior limbs; Bates suggested that the *Mantis* fed on the Phasmid, but as yet we can only guess. The female *Pyrgomantis singularis* is like certain *Phasmodea*, though the probable explanation is that both resemble twigs, but independently of each other, and that this is not a case of mimicry. Sharp tells us that Mr. Graham Kerr found on the Pilcomayo river a Mantid exactly resembling the lichen on which it lived; it was accompanied by a Phaneropterid grasshopper, which bore a similar resemblance to the lichen, but this case is analogous with the last. The *Phasmodea* present an extraordinary variety of form, and almost invariably show remarkable assimilation to their surroundings, but I can find no case of a Phasmid resembling other living creatures.

In the *Acridioidea*, we find the remarkable family *Proscopidae*, in its attenuated apterous form, which recalls the slender *Phasmodea*, but we have no evidence to show any association between the two groups. It must be borne in mind that in the *Proscopidae* different parts of the body are modified from those in the *Phasmodea*, so that we have a similar effect from similar modification of different parts. In the *Tettigidae*, some genera, *Xerophyllum*, Bol., *Cladonotus*, Bol., *Chorophyllum*, Serv., possess the pronotum greatly dilated and compressed, which brings about a close resemblance to dried leaves and certain *Membracidae*. Fabricius, indeed, included some species in the genus *Membracis*. In the *Mastacidae* we find quite a distinct form of mimicry. The genus *Erucius*, Stal., has long wings and elytra, clear and hyaline, even the latter being transparent. When these curious grasshoppers are set with the legs stretched out behind, the strong resemblance to smaller dragonflies is obvious. They are natives of India, Java, and Borneo, and offer the least questionable case of mimicry that we can find in Orthoptera. The species of the genus *Mastax*, occurring in tropical South America, have been noticed to imitate other insects. Gerstaecker has called attention to the resemblance of *Mastax personata*, Bol. (= *imitatrix*, Gerst.), to species of *Sirex*.

In the *Locustodea* occurs what is, perhaps, the most remarkable case of mimicry recorded in Orthoptera. This is the well-known instance of *Myrmecophana fallax*. This insect belongs to the *Phaneropteridae*, a group in which the species are usually large, and chiefly bright green in colour; but *M. fallax* is strikingly like an ant in appearance. The antennæ are comparatively short, the general colour is black, the appearance of the stalked abdomen, that is so characteristic of ants, being produced by white patches on the sides, visible also from above. The specimens are wingless, have no ovipositor, and are very small. The result is an extraordinary resemblance to an ant. They were taken in the Sudan, in the Antinori expedition, and are figured by Brunner and Sharp. They are very likely immature, but the development of wings, and an ovipositor, however small, would certainly contribute to spoil the effect. Other cases of mimicry in *Locustodea*, more or less doubtful, are *Phasmodes ranatiformis*, from Australia, like a slender apterous Phasmid; *Prochilus australis*, like a winged Phasmid; and the elongate South African Sagid, *Peringueyella*

jocosa, Sauss., figured by de Saussure, resembling *Proscopidae*, and some *Truxalidae*, in its slender appearance.

I know of no cases of mimicry in *Gryllodea*, unless *Trigonidium cicindeloides* can be said to resemble small *Coleoptera*.

ORTHOPTERA: REVIEW OF WORK DONE IN 1898.—Little has been done with regard to British species during the past year. *Mecostethus grossus*, L., was again taken in the New Forest, but the most interesting species that has been prominently noticed is *Forficula lesnei*, Fin., which has been proved to be widely distributed and fairly common in this country since its presence was pointed out two years ago. Collectors, especially those engaged in beating, should keep a sharp look-out during the coming season for *Apterygida albipennis*, Meg. This little earwig was taken scantily by Westwood near Ashford sixty years ago, but has not been found since. It occurs in flowers and on shrubs, especially near water, and is a common central European species. As I pointed out in *The Entomologist* in June last, *Chelidura acanthopygia*, Gené, is so distributed in Europe as to justify the prediction of its future capture in England, especially in the south-eastern counties. Of the literature published, there is little to say. The *Biologia Centrali Americana* appears spasmodically, M. de Saussure having nearly completed his share of the work, and we look forward to the volumes on the *Acridiodes*, and more especially Brunner's work on the *Phasmodes*. The same orthopterist has published an account of Dr. Kükenthal's collecting in the Malay Archipelago, and Zubowsky has given us a useful and interesting work on the *Acridiodes* of Asiatic Russia. Bolivar is engaged in bringing up to date our knowledge of the Orthopteran fauna of the Iberian peninsula, and Scudder has brought out a monumental revision of the ponderous genus *Melanoplus*.—M. BURR, F.Z.S., F.E.S., New College, Oxford. January 23rd, 1899.

NOTES ON COLLECTING, Etc.

LEPIDOPTERA AT BOGNOR.—During the latter half of July I was at Bognor, and came across the following Lepidoptera: *Vanessa io*, a fine brood of larvae; *Pyrameis atalanta*, many young larvae, all of which were ichneumonized; *Euchelia jacobaeae*, *Porthesia similis* (*auriflua*), *Leucoma salicis*, *Clisiocampa neustria*, larvae of which were all more or less abundant. The following imagines were also observed:—PAPILIONIDES.—*Pieris brassicae*, *P. rapae*, *P. napi*, *Epinphele ianira*, *F. tithonus*, *Aglais urticae*, all fairly plentiful. ARCTIIDS.—*Euchelia jacobaeae*, *Porthesia similis*, *Leucoma salicis*. LASICAMPIDES.—*Clisiocampa neustria*. GEOMETRIDES.—*Rumia luteolata*, *Boarmia gemmaria*, rather dark forms and principally males; *Hemithea thymiara*, worn; *Asthenia luteata*, one very fresh example; *Acidalia virgularia*, *A. stramineata*, *A. aversata*, *A. remutata*, *Timandra amatoria*, *Cabera pusaria*, *Abraxas grossulariata*, ordinary forms, *Hydriomena furcata* (*elutata*), *Melanithia ocellata*, *M. bicolorata*, *Melanippe montanata*, *M. galiata*, *M. fluctuata*, *Anticlea rubidata*, three fresh examples, *Camptogramma bilineata*, *Cidaria fulvata*, *C. miata*, *Eubolia limitata*, *Eupithecia vulgata*, *E. subnotata*. NOCTUIDES.—*Triaena psi*, *Bryophila perla*,

Leucania impura, *L. pallens*, both common at dusk, flying over low herbage in a field, *Xylophasia lithorylea*, *X. polyodon*, both taken on logs of wood near the shore in the daytime, *Apamea didyma*, *Miana fasciuncula*, *Agrotis segetum*, *A. exclamationis*, *Triphaena interjecta*, dark aberrations, *T. pronuba*, *Plusia pulchrina*, *P. gamma*, *Mania maura*, one on a log near the shore in the morning, *Dianthoecia capsicola*, *Aventia flexula*. DELTOIDES.—*Hypena proboscidalis*. PYRALIDES.—*Botys verticalis*, *Hydrocampa nymphæata*, *Ebulea sambucalis*. CRAMBITES.—*Crambus tristellus*, *Aphomia melonella*. PTEROPHORIDES.—*Aciptilia pentadactyla*. My time was much occupied, and I was unable to sugar. The species mentioned were all obtained by beating two or three hedges near the shore in the daytime. —HUBERT C. PHILLIPS, M.R.C.S., F.E.S., 83, Shirland Gardens, Paddington, W.

LEPIDOPTEROUS LARVÆ IN THE NEW FOREST.—At the end of September last insects were not very plentiful in the New Forest. A few quite full-fed larvæ of *Heterogenea cruciata* (*asella*) were still about; *Demas coryli*, scarce and small, and *Drepana unguicula*, little better. There was a fair number of *Gnophria rubricollis*, just full-fed, and *Ephyra trilinearia* of all shades and sizes.—E. A. BOWLES, M.A., F.E.S., Myddelton House, Waltham Cross.

PUPA-DIGGING IN NOVEMBER.—I have been very busy pupa-digging lately, and have obtained above 800 pupæ up to the present time, among them being—41 *Smerinthus iliax*, 9 *S. populi*, 8 *Poecilocampa populi*, 23 *Cymatophora ocularis*, 5 *Cramphora ligustri*, 17 *Amphidasys betularia*, 8 *Ptilodontis palpina*, 1 *Notodonta dictæa*, 42 *Euptheia fraxinata* (I am not certain of these, but obtained them under moss on ash trees), 11 *Cuspidia megacephala*, &c. — (Major) R. ROBERTSON, Cheltenham.

CHOEROCAMPA CELERIO AT STRATFORD.—It may interest the readers of the *Entomologist's Record* to know that a specimen of *Choerocampa celerio* was taken on November 21st, 1898, at Stratford, Essex, by a man who had no knowledge of its scarcity. The insect is in fairly good condition, considering the way it was captured. The man had an idea it would sting him, so caught it in his cap, and placed it from that into a bottle, alive. I managed to effect an exchange, and it is now in my possession. It is rather a strange coincidence that my father obtained one in the same neighbourhood about twelve years ago. —COLIN MURRAY, 47, Water Lane, Stratford, Essex.

FOOD-PLANTS OF *TRICHIURA CRATAEGI*.—I have always found this larva most commonly on whitethorn in this neighbourhood. Although it may be found by day, especially in dull weather, by far the best plan is to search for it between 8.0 and 9.0 p.m., when it crawls up the tender shoots at the tops of hedges (especially those cut the previous year). I have also found it pretty commonly on blackthorn, and very rarely on oak and hazel. During the five years I lived in Lincolnshire (1892-96), I did not succeed in finding it on anything but whitethorn, on which I took no less than 40 larvæ, during four evenings' search, early in June, 1890. These produced exceptionally fine imagines, very large and dark compared with the form which occurs here.—(Rev.) G. H. RAYNOR, M.A., Hazeleigh Rectory, Maldon, Essex. December 29th, 1898.

In reference to the question of food-plants of *Trichiura crataegi*

raised lately in the *Entomologist's Record*, I may state that I have never found it in the wild state in Norfolk or Suffolk on any other food than whitethorn (*C. oxyacantha*). This insect is always somewhat rare in these counties, half-a-dozen or so larvæ being generally all that fall to my lot in a season. Two years ago a female laid me about 20 ova, and the young larvæ took at once to the whitethorn I gave them, and fed up fairly well.—M. A. PITMAN, 11, Park Lane, Norwich.

PROPOSED ACCLIMATISATION OF FOREIGN LEPIDOPTERA.—I should be glad to receive advice as to the best species of foreign Lepidoptera on which to experiment with a view to their introduction into the county of Sussex: also any information as to experiments already made.—A. H. RYDON, Awbrook, Lindfield, Sussex.

DATA OF BRITISH LEPIDOPTERA WANTED.—Now that the first volume of my work on the "British Lepidoptera" has been published, and lepidopterists have formed an idea of the scope of the proposed work, I would again beg for material and data to complete the manuscript still in hand and for which space was not forthcoming in the first volume. This relates to the Psychids, the Pterophorids, the Lasiocampids, the Saturniids, the Endromids, the Sphingids, the Hepialids, the Zeugsterids, and the Cossids. I am particularly anxious to see the eggs (or to have good descriptions and measurements of the eggs), the newly-hatched (as well as full-fed) larvæ, and pupæ, myself, for the purpose of description. At the same time, I want complete lists of localities, dates of capture or breeding (spread over as many years as possible) from every part of the country, lists of food-plants, notes on parasites, and any other interesting facts that may come to the notice of any observer. Notes on the eggs of Hepialids, as soon as laid, with further notes on the rapidity of their colour-changes, are badly needed. Still more so are descriptions of the eggs of Psychids and Pterophorids. Will lepidopterists please make a point of sending me eggs of any species in which they are specially interested and which they know particularly well? I am also anxious to get cases (with or without larvæ) of *Teichobia verhuellella*, *Diplodoma marginipunctella*, *Xysmatodoma melanella*, *Talaeoporia pseudobombycella*, &c., *Solenobia inconspicuell*, &c., *Fumea*, all species, when available.—J. W. TUTT.

CURRENT NOTES.

On January 17th the Entomological Club held a meeting at the Holborn Restaurant. After the meeting a great many well-known entomologists, the guests of Mr. G. H. Verrall, sat down to an excellent supper in the "Entomological Salon." Among the members present were:—Messrs. Adkin, Hall, Porritt, South, the veteran Sam. Stevens, and Dr. Mason, the only absentee of "the eight" being, we believe, Dr. Lowne, of "blow-fly" fame. It is impossible to mention all the well-known entomologists present. We noticed Colonels Swinhoe and Yerbury, Drs. Chapman and Dixey, the Rev. H. S. Gorham, Messrs. Austen, Barrett, Bateson, Blandford, Bradley, Burr, Carrington, Champion, Distant, Druce, Edwards, Elwes, Fenn, W. H. B. Fletcher, Gahan, Godman, Goss, Jacoby, Janson, A. H. Jones, Kirby, Lloyd, Martineau, McLachlan, Trimen, Tutt, Vice, Wainwright, Walker, Waterhouse, &c. The host proposed "The Entomological Club," giving a brief *resumé* of its his-

tory; Mr. Trimen, in a few well chosen remarks, proposed the toast of "The Chairman."

A young man who is not afraid of rough work is wanted to spend two or three seasons collecting insects in the Hudson Bay Territories. He must have had experience and be really a keen naturalist. Full particulars can be obtained on application to H. J. E., Colesborne, Andoversford, R.S.O.

On January 18th, 1899, Mr. G. H. Verrall was elected President of the Entomological Society of London, and has since appointed the Rev. Canon Fowler, Mr. Edward Saunders, and Mr. Roland Trimen, vice-presidents for the year. We presume from the appointment of the eminent hymenopterist as one of the vice-presidents that he is likely to return to take again a more active part in the affairs of the society. Since his retirement from the position of Treasurer, in 1890, he has practically attended none of the society's meetings, and must be almost a stranger (except by name) to many of the younger Fellows who have been elected during the present decade. As it is reported that there is not a single reference to Hymenoptera in the *Transactions* for the past year, Mr. Saunders' return may be fairly expected to cause more attention to be devoted to this order in the immediate future.

We understand that the City of London Entomological Society has formed a special "Publication Fund" for the issue of its *Transactions*. This is very praiseworthy, and means that a certain proportion of members are willing to make a considerable sacrifice in order to support the scientific aspirations of the society. There must be many wealthy country entomologists to whom the subscription of 7s. 6d. a year would be literally nothing, and who would not object to help a society like this, either by joining or by purchasing a copy of the *Transactions*. A complete set of *Transactions* from 1891 now makes a couple of fairly large volumes; but wealthy entomologists of the younger school compare unfavourably (with some noteworthy exceptions) with their predecessors, who supported science for its own sake, and backed everything useful published in their own branch of science without asking whether it was directed solely to that small section of entomology that they themselves were studying. Mr. H. A. Sauzé, 4, Mount Villas, Sydenham Hill Road, S.E., would be pleased to hear from entomologists who will support the society in its efforts to continue the publication of its *Transactions*.

Mr. Roland Trimen's presidential address to the Fellows of the Entomological Society, was a splendid *resumé* of all that is known of the phenomena and causes of "Seasonal Dimorphism in Lepidoptera." The standard of the presidential addresses of the last few years has been a high one, worthy at the same time of the traditions of the society, and showing that our leaders have not only kept well abreast of the rapid advance that the science has made during the last few years, but are themselves in the van of that advance, pointing out new facts and giving explanations of phenomena which have until now eluded our very best savans.

We are pleased to call the attention of our readers to *A Complete Catalogue of the Butterflies of the Palaearctic Fauna*, by H. C. Lang, M.D. [Published by O. E. Janson and Son, Great Russell Street, W.C.], to be completed in six parts of 32 pp. each: the price of each part, 1s. The *Catalogue* is to contain the "time of appearance,"

"distribution as regards the Palaearctic region," "food-plants," and "time of appearance," if known, together with "a list of the varieties and aberrations of the various species." It is to be hoped that in the latter the aberrations described in Britain will not be omitted. The only species we can test in this direction in the first part is *Papilio machaon*. Of the named aberrations of this species, Tutt's *British Butterflies* (1896) mentions the following: ab. *flava*, Tutt, ab. *pallida*, Tutt, ab. *sphyrus*, Hb., var. *asiatica*, Mén., var. *burdigalensis*, Trinn. (= *aurantiaca*, Spey.), var. *centralis*, Stgr., ab. *watzkai*, Garb., ab. *drusus*, Fuchs, var. *hippocrates*, Feld., var. *soliman*, Bdv., var. *alaska*, Scud., var. *oregonia*, Edw., var. *saharæ*, Oberth., ab. *nigrofasciata*, Rothke, ab. *niger*, Reutti, var. *sikkimensis*, Moore, ab. *marginalis*, Robbe. The forms mentioned by Dr. Lang are: ab. *sphyrus*, Hb., var. *saharæ*, Oberth., var. *asiatica*, Mén., var. *aurantiaca*, Speyer, ab. *niger*, Reutti, ab. *nigrofasciata*, Rothke, var. *centralis*, Stdgr., ab. *watzkai*, Garb., ab. *drusus*, Fuchs, var. *hippocrates*, Feld., var. *kantschatalabus*, Alph., so that seven named forms of this species that were described before 1896 are missing in the *Catalogue*. With the exception of Alphéraky's var., the remainder are those in Rühl's *Palaearktischen Grossschmetterlinge* (1892). This will be a most useful publication if carefully compiled so as to actually bring the whole of the knowledge at our disposal at the present time under the heads indicated, within a small compass, but all authors subsequent to Rühl should be consulted.

Mr. Meade notes (*F.M.M.*) the following Diptera as having been found by him in Britain during the last few years:—*Dolichopus agilis*, Mgn., from Bradford, 1886, and Windermere, 1892; *Hylemyia grisea*, Flin., Oxshott, Surrey, frequenting nests of Hymenoptera; *Pegomyia palliceps*, Ztt., from Taynult; *Cordylura rufigana*, Mgn., ? locality; *Norellia nerrosa*, Mgn., from Bradford, June 14th, 1884; *Cleigastra nigrita*, Flin., ? locality; *Cleigastra tibiella*, Ztt., ? Lake District; *Hydromyza fraterna*, Mgn., Windermere, 1884; *Scatophaga fontanalis*, Rnd., Windermere, 1892; *Scatophaga villipes*, Ztt., Silverdale, April, 1875, Taynult; *Scatophaga heteromyzina*, Ztt., Windermere, July, 1892; *Fucellia muscaria*, Ztt., ? Bowden.

Mr. J. Edwards, Colesborne, Cheltenham, asks for records of captures of beetles in Norfolk, for incorporation in a Supplement to his *List of Norfolk Coleoptera*, which goes to press early in March.

We have no doubt now that Mr. Tutt has published the first volume of his work on *British Lepidoptera* that he will be offered much additional material and data relating to the families already dealt with. Authors usually have material offered them when too late to be of service. We would call attention to the notice by Mr. Tutt (in another part of this number) of the material that he now requires and that would be of use to him.

PRACTICAL HINTS.

Field Work for February and March.

By J. W. TUTT, F.E.S.

1.—The larvæ of *Stilbia anomala* are best found at the end of February by the aid of a lantern, for they feed quite exposed at night on grass (Norman).

2.—In Portland the green larvæ of *Epunda lichenea* are to be found from the middle of February to the end of April, at night, on the top of grass stems, generally in little colonies of five or six, in sheltered spots at the foot of banks, beside large boulders, or in the crevices of the rock. When older they become olive-coloured, and hide among the roots of low plants (Brown).

3.—The larvæ of *Elarhista stabilella* mine the leaves of *Aira cespitosa* on chalk, and may be found in February in the brown withered tips of the leaves, from which they make pale yellow mines to the stem, pupating in April at the base of the blade under an oval-shaped web (Warren).

4.—Those well-placed for sallowing should commence work as soon as the earliestallows are in blossom. The Taeniocampids and hybernated *Hopiorina croceago*, *Xylina semibrunnea*, &c., are on the move as soon as the earliest catkins show. The pistillate catkins are just as attractive as the staminate ones.

5.—Always sugar in the spring, when sallowing, for *Dasyampa rubiginæa*.

6.—Never forget in March and April to fill a large linen bag with sallow catkins (not too old). Many Noctuids and Tortricids will be bred.

7.—The larvæ of *Apamea unanimitis* are to be found in March under the bark of old trees on the borders of marshes, etc. They are also to be found in March and April among grass at the roots of willows in similar places.

8.—*Aleucis pictaria* appears with the first fine days of spring, flying in the evening about the sloe-bushes in flower (Guenée).

9.—In March, with a fern-scoop, dig up roots of thistles, plantain, ragwort, knapweed, dandelion, etc., for root-feeding larvæ. Place in flower-pots, etc. In this way *Orthotaenia striana* (from dandelion), and many other species, may be bred (Barrett).

10.—In March and April collect teasle heads and keep in bandbox, you will breed *Penthina gentiana*.

11.—A female *Amphidasys strataria* enclosed in a small muslin bag (3in. diameter) hung in a sheltered position on the outskirts of a wood will attract males in suitable weather from 10 p.m. to 12 p.m. (Alderson).

12.—Those who can should grow *Tritoma uaria* (popularly known as Red-hot Poker or Torch-flower). It is as attractive as ivy-bloom to autumnal moths, and stupefies them in the same manner (Mason).

13.—By the end of March those who want *Tephrosia bistortata* should commence to search the tree-trunks regularly.

14.—In March and April the pale-coloured larva of *Boarmia repandata* is very conspicuous at night on sloe and bramble twigs.

15.—A supply of small calico bags is one of the most important items in the lepidopterist's outfit. They are infinitely better than tins for many larvæ—especially those feeding in flower or seed-heads, rolled leaves, &c.

N.B.—For similar series of "Practical Hints" for February and March see vol. x., pp. 17-18, pp. 49-50; vol. ix., pp. 42-43, etc.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

CIDARIA RUSSATA SINGLE-BROODED IN SCOTLAND.—It is usually held

that the one reliable distinction between this and *C. immanata* is that the latter is single-brooded, whilst *C. russata* has two broods in each year. That this is so in England, or rather the south of England, is undoubted, but from some observations I made whilst in Scotland this summer, it seems doubtful if either species has there more than one brood in a state of nature. My son, on July 10th, captured several undoubted specimens of *C. russata* in the neighbourhood of Oban, one of which, being a female, I kept for ova. These hatched towards the end of the month, fed very slowly until the middle of August, and then commenced to hibernate whilst in the second instar; they have now not touched food for three months.—W. G. SHELDON. Nov. 17th, 1898.

DIANTHÆCIA CONSPERSA TWO YEARS IN PUPA.—During early June, 1896, whilst staying in Cornwall, in the *Lycaena arion* locality, I obtained five *Dianthæcia* larvæ from *Silene maritima*. These all pupated, and the pupæ were kept separate. None emerged in 1897, but this year they all produced *D. conspersa*. The specimens are all darker than the usual southern form, and one has the portions usually white, dark ochreous.—IBID.

EGGS OF LEPIDOPTERA.—*Asteroscopus sphinx*.—About 200 ova were laid on November 14th-15th by a recently-emerged ♀, which came to light on November 12th. They were deposited in patches or in chinks between opposing surfaces, some overlapping, or in rows in superficial fissures; a few only were solitary and scattered. In colour they are pale grey, becoming in a week or ten days gradually dark purplish grey, and afterwards leaden with a slight purplish tint, especially around the micropyle. Their shape is that of a large sphere both hemispheres of which have been considerably flattened. The transverse diameter measures from 1·2 to 1·32mm. The ratio of vertical measurement to transverse is 3 : 5. The equator is very prominent, and forms a distinct rim marked by 40 ribs (20 primary and 20 secondary). These are moderately raised. The primary ones start from the outside of the micropylar area, and some are a little sinuous near their origin. The micropylar area is ·33mm. in diameter, the surface finely roughened like coarse paper, flattened, slightly depressed, and somewhat darker in the centre.—WILLIAM S. RIDING, B.A., M.D., F.E.S., Buckerell. December 5th, 1898.

REVIEWS AND NOTICES OF BOOKS.

BRITISH LEPIDOPTERA, By J. W. Tutt, F.E.S. [Published by subscription, price 15s. to subscribers.] The names of the following gentlemen have been received since the publication of the additional list of subscribers in *The Entomologist's Record*, vol. xi., p. 28 :—

Right Hon. Lord Walsingham, M.A., LL.D., F.R.S., F.Z.S., etc. (2 copies), Messrs. J. E. R. Allen, Herbert Ashby, F.E.S., W. H. Barton, F.E.S., H. J. Elwes, F.R.S., F.Z.S., F.L.S., F.E.S., G. D. Hancock, H. W. Head, and Carleton Rea, M.A., B.C.L.

The author begs again to thank all those ladies and gentlemen who have kindly supported this publication. The book was obtainable from the publishers on February 6th, and from that date the price was raised to £1.

The Entomologist's Record

AND

JOURNAL OF VARIATION.

VOL. XI. No. 3.

MARCH 15TH, 1899.

Collecting Lepidoptera in Trinidad.

By W. J. KAYE, F.E.S.

Having had the rare opportunity of a four months' visit to the West Indies and Venezuela, and having seen so much that was altogether new and interesting entomologically as well as in a thousand other ways, I feel that it is my duty to impart something which may be of value to others, although at the same time quite conscious of my inability of making the most of it.

I embarked on May 4th, and landed at Trinidad on the 18th of the same month, fully expecting to come into the rainy season. But instead—brilliant weather, and everything parched. The first few walks in the neighbourhood of Port of Spain showed me that there was some good ground near at home consisting of V-shaped valleys, with streams at the bottom, or beds, which contain streams when the rain comes. From one of these, the Cascade valley, I met, on the first day, with *Morpho peleides* (the only species of the genus in Trinidad), *Eryphantis automedon*, a lovely species belonging to the *Morphinidae*, spanning 4", and of a rich purple, *Tithorea flavescens*, named again only so recently as 1889, although the insect was, and is, a common one near Port of Spain. I have just ascertained that the insect was renamed in error by Kirby. Godart called it *Heliconius megara* in 1819, considering it a var. of *Tithorea harmonica*, Cr. There were no specimens in the N.H. Museum at the time Kirby renamed the insect, but a full series has since been sent over. Perhaps the insect is confined to Trinidad, as I can find no record outside that island. *Pirella dracontis*—much worn. The habit of this latter insect, which has beautiful blue hind wings when fresh, is most odd. It seldom, if ever, flies higher than 2ft. 6in. from the ground, and more often only a few inches. With such a liking to be near the ground, one would expect that its capture was not difficult. But it has another peculiarity—it can alter its course with a rapidity that is astounding, and being fond of damp shady places where plenty of ferns, etc., grow (underneath which it frequently flies), its capture is a most tantalising operation. Besides these more conspicuous species, there were numbers of others less so, the mere names of which would convey little or nothing to the majority of your readers. *Heliconius melpomene* was, however, another conspicuous insect with its bright red bars on the velvety black ground colour. Horticulturists complain bitterly of the ravages the larva of this insect makes among the passi-

floras. Subsequent visits to this and other valleys (similar valleys extend for upwards of 20 miles across the north side of the island) produced numbers of interesting insects. The *Hesperiidae* were especially interesting. As many as 50 species have already been recognised from Trinidad, the "skippers" ranging from 2½ in. in expanse, in the genus *Nascus*, down to diminutive *Pamphilinae*, of ½ in. expanse. Of the *Lycaenidae* it was remarkable how few were to be seen in these situations. By far the best ground for this group I found to be the Royal Botanical Gardens, where I secured some lovely species, foremost amongst which was certainly *Timolus demonassa*, a gorgeous species with black velvety forewings and lustrous sky-blue hind wings. They flew very little, and only flitted or skipped, as is the manner of the *Hesperiidae*, from flower to flower, and I had no idea of the beauty of the insect till I set it. Before leaving the valleys I should just like to mention the wonderful sharpness of the vision of a negro. I not unfrequently came up with men going my way, and when they knew I was after butterflies, they used to point out things at rest which I should have passed by, so perfect were some of the resemblances to rotten wood, &c. This, without a special entomological training, struck me as being remarkable. But I learned afterwards that the negro knows the every-day plants, insects, birds, &c., much better than the average Britisher. I say this of the black man on his own soil. Of course the names used by them are only popular names, often understood only among the dark population. But such names as "Biscuit" (*Anartia jatrophae*), "Under Leaf" (*Gymnas iarus*, settles on the under-side of the leaves), "Green Page" (*Urania leilus*), "Queen's Park" (*Heliconius melpomene*, red and black—colours of the cricket club of that name), and the "Evader" for *Pierella dracontis*, show that the negro is alive to the existence of the Lepidoptera. On other occasions, in these valleys, Caligos were to be seen sitting on the tree trunks, the large eye-like marking being then very conspicuous. The time of flight of these insects is at dusk, and moreover these, as well as the Morphos, are attracted by a fire, which tends to show strong testimony of the artificiality of the demarcation between butterflies and moths. Morphos, it might be mentioned, only fly naturally when the sun is shining. They are easily attracted to carrion or rotten fruit, when their capture is easily effected. Speaking about the crepuscular flight, I may note that *Eryphanis automedon*, an insect closely allied to the Caligos, was taken at dusk. A very numerous genus in Trinidad is *Euptychia*. These insects have much the same habits and general appearance of our *Enodia hyperanthus*. They are generally to be found in companies, though in the case of the commoner species they appear to be everywhere in wooded situations. Such are *E. hesione* (= *occirrhoe*), the whitish hind-wings (barred with brown), of which appear semi-transparent on the wing, *E. hermes* and *E. renata*. *E. arnea* I noticed to be very common at Verdant Vale, but nowhere else. This latter species is very weak in flight, and flies very low down. The semi-transparent metallic patches on the anal portion of the hind-wing are not conspicuous in flight, and the insect might readily be passed as one of the more sombre species. In the closely allied genus *Taygetes*, *T. penélea*, I noted to be common in the Morrison Valley, and it seemed to delight in very dark and damp places. In this same valley

many species of this and the preceding genus were frequently to be seen together, a few paces through the long grass sometimes causing a whole cloud of them to rise from the grass blades on which they settle.

Of the *Nymphalinae*, to which belong some of the most striking combinations of colour among the South American forms, there were many interesting species. *Colaenis julia* and *C. phaerusa*, curiously shaped species, with very elongated forewings, were seen always much attached to flowers, being particularly fond of a bright scarlet flower; *Dione vanillae*, common amongst Guinea grass, on which the larva *noir* feeds. As the grass is, as its name might imply, an importation, it would be interesting to know what else the larva feeds on or fed on previous to the introduction. *Anartia amalthaea*, nearly always to be found in very damp places, irrespective of the dry and wet season, while *A. jatrophae* has just the reverse taste, loving the dry, dusty roadsides. The genera *Callicore* and *Catagramma* have very few species recorded as yet, but their inaccessibility perhaps accounts for their not having been more noticed. They fly exceedingly high, nearly always round the tops of the trees (frequently cocoa), no matter how high, except when they descend to a pool of water, evidently to drink. On the last day of my stay in the island, I noticed a pair of *Catagramma pitheas* (hitherto unrecorded from Trinidad), flying at a great height round a tree top. The *Catagrammas* are known to the nigger as the "date butterflies," because they suppose that the curious 88 or 89 looking markings, on the underside, change with the year. Being the year '98 it was useless, in my case, to argue the point. There is a saying that the unexpected always happens, and certainly both this and the converse happened to me. I had fancied that the primeval forest was the place of places for collecting. But I took little or nothing in such places. It is true that one or two of the insects so taken were new. But as a general rule (in the West Indies) the ancient forest is not worth working in the day-time. By the kindness of Mr. Urich I was able to work the high wood pretty systematically, as he was stationed at a place called Tabaguite, which is at present just a clearing in the forest, but which is to be the terminus of a new railway extension. At night, good collecting is to be done with a lamp in the verandah, or, as it is known out there, the gallery. The deafening noise of the tree frogs, cicadas, etc., at sundown, is something very novel to listen to for the first time. And then, if it is to be a good night for collecting, the fire-flies (*Elateridae*) will be well in evidence, making the scene much more fairylike than the very best transformation scene at Drury Lane. Representatives of almost every group of moths came to light, including what are supposed to be day-flyers. Such were one or two *Syntomidae*, two or three *Limacodidae*, the representatives of which we in England always take in the day time, as well as some *Sphingidae*. The number of micros with small flies, ants, and others, is something enormous on a good night—and a good night, let me remark, is just as necessary in the tropics as elsewhere. A bright moon, and other well-known ominous signs to collecting in this country are just as fatal with the thermometer 20° higher in a tropical country.

Lepidoptera with a general inland distribution in Europe but confined to coast habitats in England.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

(Concluded from p. 342.)

The coast species that depend, then, on the higher coast temperature for some winter-feeding appear to be *Thymelicus actaeon*, *Sesia chrysidiformis*, *Melitaea cinxia*, *Caradrina ambigua*, *Heliothis peltigera*, *H. armigera*, *Lithosia lutarella* var. *pygmaeola*, possibly also *Agrotis lunigera* (which is, I think, more probably a truly coast insect, with not quite such southern limitations as *Leucania putrescens*), *Agrotis obelisca*, *A. simulans*, and *Actebia praecox*.

With regard to three of these, viz., *M. cinxia*, *T. actaeon*, and *S. chrysidiformis*, another element comes in. They are day-flying insects, and, as regards *M. cinxia* and *T. actaeon*, at least, occupy precisely such extra favoured warm nooks as I have above alluded to. It is very probable, therefore, that the clearer skies of the south coast, and the fact that such nooks are often warmer in summer for some days together than any inland station, have more effect in these cases than the mildness of the winter.

Dianthoecia albimacula is, again, a species that passes the winter as a pupa, and does not perhaps value a mild winter so much as the possession of warm and sheltered quarters in summer; though, as I have already noted, a mild winter and early spring will favour, though in a less degree, pupæ as well as larvæ.

M. cinxia is now and probably has always been confined to the south coast, and to such special places as the undercliff at Ventnor. Its Continental distribution extends up to the summer isotherm of the south coast. That of *T. actaeon* does not reach so far north.

Sesia philanthiformis may be taken as an example of a combination of causes, restricting a species to the coast, though having inland stations on the continent, and extending a little north of the mean south coast isotherm. In Britain it reaches a considerable distance north of this isotherm, and so probably benefits by mild winter temperatures. The climatic conditions would, no doubt, however, permit it to occur inland in south Britain, if its food-plant grew at such stations. This is not, however, the case, the plant only occurring inland at such elevations and so far north as to be outside the climatic range of the species. Several *Dianthoecias*, probably, are governed by similar conditions—*D. luteago*, *D. caesia*, *D. capsophila*.

There are a good many species that are not confined to the absolute coast, but yet have, with us, such an extreme southern distribution that the mild winter is certainly an element in enabling them to retain a footing on our shores. Such are *Rhagades globulariae*, *Orrhodia erythrocephala*, *Xylophasia subulstris*, *Callimorpha hera*, *Eulepia cribrum*, &c. A large proportion of these hibernate as larvæ.

Those species that do not remain with us, but are immigrants, are still dominated by the same climatic elements, such as *Argynnis lathonia*, *Colias edusa*, *C. hyale*, *Everes argiades*, *Lampides boetica*, *Deilephila gahii*, &c. Some of these are unable to stand frost, such as *C. edusa*. There are spots on our south coast that escape frost for a year or two, so that I incline to accept it as probable that *C. edusa*, for instance, does, sometimes, maintain a foothold in England for a season or two

without immigration. But I cannot call to mind any permanent resident in our islands that is unable to withstand frost, though it ought to be possible for such a species to exist in the Scilly Isles or in the extreme south-west of Ireland. Other immigrants such as *A. lathonia* and *D. galii* do not find even the most favoured spots in this country sufficiently warm to enable them to complete the cycle of their transformations within the year. It is characteristic of immigrants that though most frequently seen on the coast, they may spread over the whole country, as is evidently the case with *C. edusa* and *P. cardui*.

There is one immigrant that very much puzzles me. It is not, perhaps, entirely apposite to the paper, yet I cannot pass it by, as I feel sure, if we knew why *Euvanesa antiopa* fails to establish itself in our islands, we should have an answer to some of the more puzzling questions of insect distribution in Britain, including some aspects of the one before us. In Europe, it extends from Naples in the south to the extreme north of Lapland, where I saw it in lat. 70deg. last summer (1898) on the same ground as *Anthrocera exulans*. It has also a very wide distribution in other quarters of the globe. Its food-plant is abundant enough in our islands. The only guess I have been able to make is perhaps a very wild one; it is that our winter climate is neither hot enough nor cold enough for it. If it were hotter *E. antiopa* could be continuously brooded, as it probably is in the extreme south of Europe; were it colder it could hibernate sufficiently. It is a species that goes into hibernation very late, and desires a very low temperature. With us it would have in spring and autumn to do what I have seen *P. cardui* doing in the south of France for weeks together in the winter, showing itself for a short time on sunny days, and neither hibernating nor progressing with its life-history. *E. antiopa* cannot probably behave in this way, owing to the hibernating tendency, which appears hardly to exist in *P. cardui*.

Epunda lichenea is probably a truly littoral species. It is found on the east coast as far north as Yorkshire, and therefore might occur inland were temperature the only difficulty. Its food-plants, at least in captivity, are varied enough, and none of them are truly littoral species. I must leave this species for a fuller knowledge of its Continental distribution, which, so far as I know, is not inland.

Lasiocampa trifolii affects our south and west coasts, and does penetrate a little inland. I think it probably belongs to the group that makes some winter progress owing to its ability to be active in our coast winter temperature. So far as I can learn, it hibernates on the Continent as a young larva; in England, at least sometimes, the eggs do not hatch till late winter. This may also be the case in its more northern Continental stations, which range north of the mean annual isotherm of our south coast, hence it ought not to require much winter assistance. The young larvæ eat during the winter or as early in spring as they can. I have a doubt whether the eggs not hatching till after winter sets in be not due to the conditions being too cold for them, and whether such an event naturally occurring would not be the first step towards the extinction of that brood. However this may be, I have no doubt that *L. trifolii* in England requires to be active during the winter in order to get through its changes in a year.

In connection with *L. trifolii*, it may be convenient to refer to the climate of the Flint and Cheshire coast. Llandudno has a winter

climate warmer than several places on the south coast. Meteorologists try, I think unsuccessfully, to explain this away. Entomologists find sundry insects here, such as *L. trifolii*, that they think ought not to go so far north. *D. galii* always flourishes here when it visits us, and so forth. It is certain, therefore, that in some way the warm Atlantic waters are deflected along this coast and raise its winter temperature, to be measured by the meteorologists and to be found in its results on insect life by the entomologist. As regards the Wallasey peninsula, there can be no doubt that its temperature is much raised, at least along its sea margins, by the constant renewal of the sea water bathing its shores, *i.e.*, by the large volumes of water constantly running in and out of the estuaries of the Dee and Mersey with the tides. A similar consideration is, no doubt, applicable to the estuary of the Thames, where the extensive flats, nearly at sea level, must benefit largely by the constant renewal by the tides of their adjacent water. How far the Thames estuary gets first choice of the warm water coming through the Dover Strait, I do not know.

Phorodesma smaragdaria is very localised in England in the Thames estuary. It certainly obtains considerable climatic advantages here compared with its Continental habitats, as it is a hibernating larva, and so probably gets the advantage of a late autumn and earlier spring than it would inland, I am not aware of the natural condition either of the larva or its food-plant in midwinter with us. This climatic advantage cannot, however, be the whole matter, or it would be found on our south and west coasts also, and even inland, as it has a considerable range of food-plants amongst *Compositae*; what the further element is I cannot suggest, unless it has something to do with the larva being restricted to one food-plant with us. Its continental range is hardly north of our south coast mean isotherm.

Two other species, *Eupithecia innotata* and *E. extensaria*, both attached to *Artemisia*, and both found on our east coasts (*E. extensaria* only there), must also have some other reason than climate for affecting the coast. They hibernate as pupæ, which makes it less likely that climate is at all effectual. I have an idea that *Artemisia maritima*, though occurring on all our coasts, is much more abundant on the east coast than elsewhere; if this be so this would no doubt assist in explaining the localising of these species and of *P. smaragdaria*.

Malacosoma castrensis, another Thames estuary species, is very puzzling. I do not think temperature is an element at all in the distribution of this insect, its northern (as well as southern) and mountain distribution on the continent make this very unlikely, nor does there seem to be any restriction involved in its food-plant. There is some indication of a partiality to occasionally flooded areas, which would no doubt be most satisfactorily met in flats of the Thames and other east coast estuaries. Unless this, and the destruction of inland stations by cultivation, are the effective agents in determining the distribution of the species, I am unable to say what they are.

Nyssia zonaria is with us a coast insect, but I see no climatic reason why it should be so, nor do its food-plants cause any such restriction. Its continental distribution is not extensive, and suggests that it could not go very far north in these islands. That it requires some of the assistance our coast climate gives, is suggested by its occurring in England in the specially warm inlet off the Cheshire coast, and in

Ireland, where it can benefit by the warm Atlantic waters, and not on the east coast; yet its absence on the south coasts of England and Ireland hint that it might easily have too much. It seems more probable that it likes bare, open, sandy country, and cannot get it with us except on our coast sandhills.

There are a number of other species that come under the same categories as these we have considered, and others, chiefly *Micros*, of which I know too little, as to habits and distribution, to feel sure about, but I have made a list of most of these, which may afford further material for discussion:—

1.—Immigrants unable to maintain a footing, either because they cannot stand frost, or because they require a warmer climate altogether. Some of these may exceptionally exist on our south coast for a year or two, or may breed in England for one season, but are either killed by frost the first winter (*C. edusa*, *C. hyale*), or emerge so late the following year (*D. galii*) as to be unable to continue. These are: *Colias hyale*, *C. edusa*, *A. lathonia*, *E. argiades*, *L. boetica*, *D. galii* (and other *Sphinges*), *Deiopeia pulchella*, *Synia musculosa*, *H. armigera*?, *Margarodes unionalis*, *Antigastra catalaunalis*, *Diasemia ramburialis*, and *Aplasta ononaria*; whilst falling doubtfully between these and the permanent residents are such species as—*Clostera anachoreta*, *Dianthoecia albimacula*, *Ennomos autumnaria*, and *Phlogophora empyrea*.

2.—Very southern species, that pass the summer as pupæ, and depend altogether on a warm winter—*Aporophyla australis*, *Heliothobus hispidus*, *Leucania putrescens*, *Lithosia caniola*, *Micra ostrina*?, *M. parva*?, *P. empyrea* (if not in previous list).

3.—Species requiring the assistance of a mild winter, but not in the especial degree of the last—*T. actaeon*, *L. lutarella*, *S. chrysidiformis*, *L. trifolii*, *L. vitellina*, *L. albipuncta*, *C. ambigua*, *Laphygma exigua* (or immigrant), *Mellinia ocellaris*, *Odontia dentalis*, *Toxocampa cracca*, *Acidalia humiliata*, *A. strigilaria*, *A. degeneraria*, *A. ochrata*, *Crambus alpinellus*, *Melissoblyptes anella*, *Nola centonalis*, *Heliothis peltigera*, *Chortodes morrisii*, and *Polia nigrovincta*.

4.—Possibly requiring the high summer temperature of south coast, with the greater amount of sunshine there—*M. cinxia*, ? *T. actaeon*, *S. chrysidiformis*, ? *H. peltigera*.

5.—On coast, because no suitable inland station far enough south, or at all, owing to food-plant cultivation—*S. philanthiformis*, several *Dianthoecias*.

6.—Probably dominated by special habit as regards water and inundations—*Malacosoma castrensis*.

7.—Chiefly determined by food-plants—*Phorodesma smaragdaria*, *Eupithecia innotata*, *E. extensaria*, ? *Anerastia lotella*, ? *Gynancycla canella*, ? *Crambus fascinelinus*.

8.—Doubtful, probably nature of soil—*N. zonaria*.

I have left out of account some species which have, in my opinion, rather an inland than a coast distribution, such as—*Rhagades globulariae*, *Orrhodia erythrocephala*, *Melitaea athalia*, *Anthrocera viciae* (*meliloti*), *Lithosia complana*, *Cochlidion arellana* (*limacodes*), *Heterogenea cruciata* (*asella*), *Porthesia chrysorrhoea*, *Bryophila muralis*, *Nonagria sparganii*, *Cleora viduaria*, *Botys flavalis*, *Xylophasia sublustris*, *Callimorpha hera*, *Eulepia cribrum*, &c., many of which differ from my list 3, only in being somewhat inland, instead of being confined to the coast.

There are other species that I have investigated, but am unable to accept as belonging to my subject, or could not ascertain enough about them to make them material for study. These are:—*Hadena peregrina*, immigrant; *Sesia ichneumoniformis*, ? coast; *Crambus alpinellus*, ? always coast; *C. salinellus*, coast; *C. contaminellus*, coast; *Gynancycla canella*, coast; *Anerastia farrella*, *Nyctegretis achatinella*, *Melissoblyptus anella*, *Anerastia lotella*, probably require the warmth of our coast winter; *Anthrocera purpuralis* (minos); *Oenistis quadra*; *Dasychira fascelina*; *Agdistis bennettii*, British only; *Epichnopteryx reticella*, British and Dutch coasts; *Mellinia ocellaris*, hardly coast, immigrant; *Agrotis candelarum* var. *ashworthii*, hardly coast; *Lithosia deplana*, *Heliothis dipsaceus*, *Boletobia fuliginaria*, *Drepana harpagula* (sicula), hardly coast; *Pachetra leucophaea*, not coast; *Fidonia limbaria*, *Scoria dealbata*, *Thymelicus lineola*, not coast; ? *Acipitilia spilodactyla*; *Agrotera nemoralis*, not coast; *Epischia banksiella*, not on continent; *Euryceron palealis*, not coast; *Aplasta ononaria*, immigrant; *Nemoria viridata*, not coast; *Botys repandalis*, probably group 8; *Xylina furcifera*; *X. zinckenii*; *Agrotis ripae*, always coast; *Crambus rorellus*; *Dasyampa rubiginea*, not coast; *Sterrhia sacraria*, immigrant.

Migration and Dispersal of Insects: Orthoptera.

By J. W. TUTT, F.E.S.

(Continued from p. 45.)

The locust invasions of the Old World have been sketched historically by many authors. Following the biblical accounts, which refer more especially to Egypt, Syria, and Asia Minor, we find that Orosius records that, "in the year of the world 3800" certain regions of North Africa were visited by immense swarms which were blown into the sea, and that the bodies washed ashore "stank more than the corpses of 100,000 men." St. Augustine mentions a locust plague that occurred in the kingdom of Masinissa the disease and want arising from which resulted in the death of 800,000 men. Pliny states that locusts immigrate into Italy from Africa, whilst a locust invasion of Germany was recorded in 1333 and one of Switzerland in 1384. Mouffet notes that in 1478 the country about Venice was invaded and 30,000 people died of famine. In 1725 the district about Rome was overrun, and in 1747 the whole of southern and middle Europe, especially the countries drained by the Danube—Wallachia, Moldavia, and Transylvania. Adamson gave a very descriptive account of a swarm that he himself witnessed in 1750. He writes: "In this voyage I was witness myself for the first time to the mischief done by locusts, that scourge so dreadful to hot climates. The third day after our arrival we were still in the road, when there suddenly arose over our heads, towards eight o'clock in the morning, a thick cloud which darkened the air, and deprived us of the rays of the sun. Everybody was surprised at so sudden a change in the sky, which is seldom overcast in this season; but we soon found it was owing to a cloud of locusts, raised about 20 or 30 fathoms above the ground, and covering an extent of several leagues, upon which it poured a shower of these insects, which fell to devouring while they rested themselves, and then resumed their flight. This cloud was brought by a very strong east wind; it was all the morning in passing

over the adjacent country, and we imagine that the same wind drove the locusts into the sea. They spread desolation wherever they came; after devouring the herbage, with fruits and leaves of trees, they attacked even the buds and the very bark; they did not so much as spare the reeds with which the huts were thatched, notwithstanding that these were so dry; in short, they did all the mischief that can be dreaded from so voracious an insect." An equally old record is to be found in Hasselquist's *Voyage to the Levant*. This partakes rather of a humorous nature. It runs as follows: "The inhabitants of Asia, as well as Europe, sometimes take the field against locusts with all the dreadful apparatus of war. The Bashaw of Tripoli in Syria, some years ago, raised 4,000 soldiers against these insects and ordered those to be hanged who refused to go." We have not elsewhere read of the inhabitants of Europe doing this, nor does the writer make it quite clear whether it was the soldiers or insects which were to be hanged if they refused to go. The humorous side of another report is evident. This related to an invasion of locusts into the districts of Odessa, Ananieff, and Robvior, and an account of the appearance of this swarm was evidently recorded rather as a disagreeable cause of breaking up a convivial gathering than for any other reason. It relates that "a gentleman invited a large party to a fête at his country house, and in the evening the place was splendidly lit up with lamps, Bengal lights, etc.; sumptuous sideboards were laid out, and a select company had assembled. All looked forward to a merry evening. The windows of the apartments had been opened, and a refreshing breeze was entering the room, when, suddenly, a loud noise was heard, and, a few moments afterwards, myriads of locusts filled the rooms, the gardens, the sleeping chambers, and every part of the villa. Fireworks and rockets were discharged in the hope of driving away these troublesome guests, but in vain. The company were compelled to leave." The breath of a disappointed gourmand thus speaks of one of these dreadful visitations. What devastation, scourge, and havoc it produced we do not learn.

In 1799 Jackson states that the whole country between Mogador and Tangier was crowded with locusts, and they were often carried westward into the ocean. From the Russian steppes vast swarms are occasionally given forth. In the time of Charles XII. (of Sweden), his army, which was in Bessarabia (when returning from Poltava), was stopped by a flight of locusts that came from the region of the Black Sea. In 1828 and 1829 enormous swarms visited the coast of the Black Sea. In 1859, in the South Russian province of Cherson and in Bessarabia, a tract 60 versts long and about 20 wide, was covered by them. The locust years in Russia are reported as 1800, 1801, 1803, 1812-1816, 1820-1822, 1824-1825, 1828-1831, 1834-1836, 1844, 1847, 1850-1851, 1859, 1861. In Germany, the years in which locusts have appeared in this century are 1803, 1825-1830, 1856, 1859. The agreement of these dates with certain of the Russian swarms is very suggestive as to their origin. In China it is stated that there are 173 records of devastating swarms of locusts, spread over a period of 1,924 years, but nothing very definite is known of them. In 1876, Colonel Prejvalsky states that swarms of locusts were seen at an elevation of 9,000ft. in the Altyn-Tag range in Central Asia. In recent years records from Australia have also been received. Those that have taken place in America are mentioned elsewhere. Köppen has worked out at

great length the geographical distribution of *Pachytylus migratorius*, which he seems to look upon as the chief, if not only migratory locust of Europe, and includes in its permanent geographical distribution part of Portugal (south of 40° N. lat.), Spain, France to Lake Geneva, part of Switzerland (to 48° N. lat.), the north of Italy, Carinthia, Hungary, southern Russian (to 50° N. lat.), southern Siberia, extending to north China and Japan. Passing south, to New Zealand, a line from Australia to Mauritius, and another crossing Africa to Madeira, are fixed as its southern limits, but this distribution must be thoroughly understood to combine that of *P. cinerascens* and *P. migratorius*, which Köppen considers as only forms of one species, a view with which most entomologists would certainly disagree, the two species being undoubtedly distinct.

As recently as 1893 the Governor of the Gold Coast reported to the Secretary of State for the Colonies that, on Thursday, February 23rd, he "received a telegram from the Curator at Aburi, stating that the entire station was covered by swarms of locusts (described as being "brown in colour and about 1½ in. in length), and that he feared they would be very destructive to the plants in the garden." On the following morning, at 10.45, the Colonial Secretary called his attention by telephone to "a vast swarm of locusts that was approaching Accra in the form of a semicircle from the north. They extended east and west as far as the eye could see. The sky, in one direction, could only be seen through the dark cloud of these insects. Their number was simply beyond all calculation. They appeared to occupy a space about two miles wide and from a quarter of a mile to a mile in height. They gradually came round in a semicircular direction, curving from Accra towards the Governor's lodge, going on to Labadi and keeping as close to the sea as the grass extended on the sand. On a long plain between the lagoon by Christiansborg Castle, extending towards Labadi, about a mile long and a quarter of a mile wide, they descended like a vast covering and consumed the grass on the plain." He adds that he was "sorry to say that they took a fancy to the cocoanut trees which he had planted some years ago in the land attached to the castle, and literally stripped the leaves that hung above the bunches of fruit, the midribs only remaining. During this time there was not a breath of wind, the sun was shining brightly, the heat was intense, and the locusts for a while had their own way. At one time the roofs of the Secretariat and of the huts at Victoria-borg, which can always be seen distinctly from the castle, which is a mile and a quarter distant, were completely hidden from view by the vastness of the number of locusts." On their first approach to Government House he had the windows and doors closed to prevent their ingress into the apartments, and when they got so close to the verandah that he could nearly touch them he shouted and struck a stick against some of the iron pillars, upon which he noticed that the locusts appearing to dislike the noise, wheeled away. He then had "some blank cartridges fired at them, and the bell which is used on Sunday for church purposes rung. The noise apparently, alarmed the locusts, for they left the castle and contented themselves with ravaging the cocoanut trees to the north of it. The market women at Accra were much alarmed at the fearful sight of these insects, and went abroad in large numbers shouting and crying out that war and famine would follow, and urging their Fetish priests to

propitiate their gods, owing to whose displeasure the locusts were sent. The last visit of locusts to the coasts is reported to have occurred about 30 years previously, when the people suffered greatly for want of food in consequence of their ravages. The rate of flight of this swarm has been roughly estimated at six miles per hour. The first arrivals reached the sea shore at about 11 a.m. and the last at about 2 p.m.; at this estimate the depth of the swarm would be about 18 miles. The extreme density of the cloud in the vicinity of Accra and Christiansborg was owing to the front of the column being stopped by the sea, and this was also the cause of the damage done to vegetation as no inclination to settle was evinced in their flight." The same observer further reports that the following day about 1.30 p.m. a cloud of locusts was observed to the north of Accra, but soon afterwards disappeared, going northwards into the interior. We have quoted this at length as an example of the better class of reports occasionally received of locust swarms in Asia and Africa. In the discussion of this report by the Fellows of the Entomological Society of London, it was stated by Elwes that on one occasion on a passage up the Red Sea on one of the old P. and O. paddle-boats, the boat had frequently to stop to clear her paddle-wheels from locusts which had settled in such swarms as to choke the wheels and stop their action.

☞ COLEOPTERA.

COLEOPTERA NEAR CARDIFF.—The winter's task of naming and arranging captures has resulted in several interesting additions to our local fauna. Amongst them are the following:—*Notiophilus rufipes*, one in the Castell Coch woods; Rotten wood, in the same locality, produced *Agathidium seminulum* and *A. rotundatum*, *Acalles ptnoides* and *Scaphidium quadrimaculatum*. *Philonthus proximus* was common in May in carrion, with *P. puella* and *P. agilis*, *Omosita depressa*, and *Quedius lateralis*. Amongst the weevils a single *Gymnetron melanarius* occurred on wild garlic; *Tychius tomentosus* and *T. squamulatus* were found at Candleston on *Lotus corniculatus*, *Sitones crinitus* on the sandhills at Pyle, and *Sitones waterhousei* by sweeping cloverfields at Llandaff. *Meligethes lugubris* occurred on wild thyme at Briton Ferry, and *Homalota pubercula* in Castell Coch woods.—B. TOMLIN, B.A., F.E.S., Llandaff.

THE DEVELOPMENT OF WINGS IN THE LARVÆ OF *TENEBRIO MOLITOR*, L.—Whereas the Insecta-Ametabola and Hemimetabola develop wing-cases during the course of their larval growth, which become larger at each successive moult, and finally develop directly into the wing-organs of the imago, it is well known this is not the case with the Insecta-Metabola. In the latter case, it is the rule for the wing-organs to be developed in the pupal stage. A short time ago, however, I was able to announce the discovery of an exception to this rule. In experimenting with meal-worms in the Berlin Zoological Institute, a full-grown larva was found, which possessed a pair of peculiar appendages on the meso- and metathorax. The appendages in question are symmetrical, those on the mesothorax somewhat larger than those on the metathorax. On both segments the appendages are fixed to the body by broad bases, the distended portion being bent round and pointing towards the rear. A more perfect examination of the thoracic

excrescences in question showed that they were not lateral or dorsal excrescences, but that they were true wing-cases, which were not so much covered with chitin as the rest of the body, and were, therefore, conspicuous on the living insect from being lighter in colour. On examining the wing-cases of a *Tenebrio* pupa, it will be found that they are placed in exactly the same position as in the larva in question, but those of the pupa are somewhat larger and folded towards the ventral side. This most unusual occurrence of the presence of wing-cases in the larva of a beetle suggests a case of atavism. In this instance one might suppose that this character (retained by certain lower orders of insects) was the remnant of an ancient structure, and that the formation of wings occurred formerly as an exception in the larva. In consideration of this supposition it is of interest to note that, leaving the wing-cases out of consideration, the larva has several other anomalies. These last are contained in the construction of the antennæ and dorsal plates. Whereas in normal meal-worms the last segment but one of the four segmented antennæ is simple, this segment is in the winged specimens indistinctly divided into two rings, the one behind the other, of which the distal again is constricted in the middle. The number of the antenna-segments has, by this means, become greater in the abnormal meal-worms, and this is apparently an approach to the eleven segments of the pupal antenna. The dorsal plates of the abdomen are also abnormal. On the first five abdominal segments they are not, as seems to be the usual case, provided with round side-pieces, but these latter are bent a little upwards, and remind one of the large lateral crests with which the abdominal plates of the pupæ are provided. These circumstances seem to point to the fact that this can hardly be a case of atavism, but a kind of premature development, a number of characters normally belonging to the pupal state being present abnormally in the larva, but in an incomplete form. The presence of wing-stumps on the two last thoracic segments should no doubt be included in this category. In these, imaginal characters appear to have abnormally shown themselves prematurely in the larva. In the meantime I have been able to find a number of *Tenebrio* larvæ, some with large and some with small wing-stumps, which show similar, and sometimes further, anomalies, *e.g.*, in the structure of the eye and thoracic plates, etc. As I have received further preserved material from other sources, I shall take the opportunity of returning to this subject another time.—R. HEYMANS.

COLEOPTERA IN THE LOWER LEA VALLEY AND EPPING FOREST IN 1898.—Among the species of Coleoptera met with by me in the above localities during the past season are many of interest, but at the same time neither district can be called an entomological paradise. Indeed, after two years' work in these localities, and making altogether more than a hundred collecting expeditions (ranging over ten miles of ground in the case of the former of them), I have failed to meet with many species which one would expect to find, and which are usually accounted "common," and others generally regarded as coming under that designation, have been very scarce. In the case of the Lower Lea Valley (the upper part of it above Hoddesdon, I have not yet visited), this remark applies more particularly to the *Carabidae*, certain species of which group, not generally looked upon as startling rarities, seem here to be much restricted in individuals, notably *Loricera*

pilicornis, and *Badister bipustulatus*, of both of which only three specimens have been met, and *Chlaenius nigricornis* (five specimens in 1897, not seen since). The large Carabid genera, too, appear to be very poorly represented in species, and I may mention that only three of *Harpalus*, five of *Amara*, and nine of *Bembidium*, have been observed by me up to the present. The apparent absence of the genus *Elaphrus*, in a district so well provided with streams and watercourses, seems very strange. Having regard to its size, *Notiophilus* is probably the only genus of this family in which we are well represented, five of the British forms occurring more or less commonly, and the sixth (*4-punctatus*) will, I think, turn up.

Pymmes Park, Edmonton, which was formerly private property, was, toward the end of last year, opened as a public park, and I took an early opportunity this year of making an entomological exploration of it. The grounds, which consist of rather more than fifty acres, possess very little timber sufficiently decayed to harbour the beetles frequenting such situations, the few species found being of the commonest description. Searching among dead leaves and other refuse under a hawthorn hedge which borders the Park on one side, was, however, not unproductive. Here, on a sandy soil, I found *Notiophilus rufipes*, somewhat common, accompanied by *N. substriatus*, *N. biguttatus*, *Calathus piceus*, and two other commoner species of the latter genus in abundance, together with a single *Patrobus excavatus*. Amongst the *Notiophili* is a specimen with three impressions on the elytra, and another, which has the facies of *rufipes*, has the legs coloured as in *biguttatus*. Out of the hedge itself I beat during June a few weevils, including *Rhamphus flaricornis* in some numbers, and *Magdalis cerasi* (1). In August I was much surprised to find scattered along it a colony of *Chrysomela lamina*. Learning that the hedge was eventually to be replaced by a wall, which would destroy their habitat, I did not hesitate to take all I could find, and I got 15 fine specimens. Most of them were concealed in crevices at the roots of the short dry grass bordering the hedge, and these were very difficult to discover, so well were they hidden. A few, however, were amongst the dead leaves, and it was the taking of one of these which put me upon the track of the others. What plant they could have subsisted upon I cannot imagine, as except a few stunted shoots of *Glechoma hederacea*, none were visible near. Amongst dead leaves at the foot of an oak on the opposite side of the Park I found on March 6th a single example of *Platyderus ruficollis*.

My other Lea Valley captures were made chiefly on the marsh land, which forms the bulk of the collecting ground. A visit to Roydon on March 19th, in company with my friend Mr. W. Hawker Smith, produced a number of *Plagiolera versicolora* hibernating under willow-bark, in the locality in which we had found it during the previous August, when, from ignorance of its identity, only a few specimens were taken. A single *Heledona agaricola* turned up in soapy fungus on a willow at Chingford Ferry, April 17th and a good series of *Scaphidema metallicum* in the crevices of a stump close by. Sweeping in May and June in the marsh fields produced a host of insects, including *Corymbites tessellatus*, *Haltica palustris* (2), *Grypidius equiseti* (8), *Phytobius 4-tuberculatus* (2), *Hypera suspiciosa*, *Baris T-album* (common), etc. On June 5th I got six *Melandrya caraboides*, five on a rotten willow pole used as a garden

fence, and one on a willow-trunk near; they vary extremely in size, the smallest being approximately 9 mm. in length and 3 mm. in breadth, the largest 18 mm. long and 7 mm. broad; the other four are intermediate between these two, but do not touch either extreme. From the middle of May onward, *Hypera alternans* and *pollux* occurred freely in a ditch on *Helosciadum*, and I took many pairs representing each form *in copula*, i.e., ♂ s. of *pollux* with ♀ *alternans*, and *vice versa*. In spite of this intercopulation the great majority of the specimens were easily referable to their respective forms, a few, however, having the elytra whitened and the markings half obliterated (cf. *Ent. Rec.*, x., p. 22.) In and about the same ditch I got a number of *Donaciae*, chiefly *sericea*, but in one very restricted part of it 3 ♂ s and 2 ♀ s of *D. affinis* were swept, and amongst some ordinary *D. linearis*, a single example of a dark purplish aberration was found. In an adjacent backwater *D. crassipes* occurred early in July, on the identical two patches of water-lilies which produced it last year, but it was again not to be found on other patches of the plant in the same stream. In the Lea itself a little later *D. sparganii* turned up, a welcome surprise; it chiefly affected the floating blades of long grass growing in the water, and was very shy. Beating nettles in one of the numerous marsh ditches at Edmonton on July 9th produced eight *Corymbites metallicus*, and a single individual occurred in another ditch a short distance off, where a few of the active little *Cryptohypnus 4-pustulatus* were boxed, together with two of the var. *ochropterus* of *Corymbites quercus*, the type being abundant. *Tanymericus palliatus* in plenty, and *Rhinoncus gramineus* (4) were amongst my other captures in July. The heat of August made things very scarce, but I made at least one good capture during that month, this being a single example of the rare *Epuraea diffusa*, out of fungus on willow; curiously enough it is the only example of the genus I have yet met with. I am indebted to Mr. Donisthorpe for kindly confirming its determination. *Cionus tuberculosus (verbasci)*, common enough in two widely-separated localities last season, was very much scarcer this year in both.

Epping Forest, some outlying portions of which skirt the Lea Valley on its eastern border, has sadly deteriorated since the days of Stephens as a resort for the coleopterist, but even now good insects will reward constant work. Frequent visits during the season provided me with a few decent species, some of which have been previously recorded from the Forest, but which, I think, notwithstanding, are worth mentioning. The majority of these were subcortical species, and those found in fungi; sweeping produced nothing of interest, and only two species at all worthy of record were obtained by beating, these being *Balaninus villosus*, one out of oak, May 28rd, and *Agrilus laticornis*, a few specimens out of oak in July. Early in April I was fortunate enough to discover in an old decaying beech at Fairmead Bottom, successive visits to which produced about 80 specimens each of *Cicones variegatus* and *Mycetophagus atomarius*, with single specimens of *Litargus bifasciatus* and *Cerylon histeroideus*. *Aphodius conspurcatus* was another capture in April; I found it rarely both at Chingford and High Beach.*

* Happening to be passing the field at Chingford again on November 20th, I profited by the hint contained in Dr. J. H. Bailey's paper in *Ent. Mo. Mag.*, vol. n.s., p. 7, as to the species occurring in the autumn, and secured a long series. I found it still "out" on my last visit on December 18th.

Cyrtotriplax bipustulata (1) turned up in moss on a birch stump, and a single *Coeliodes ruber* on a refreshment stall under an oak. *Onthophagus vacca* and *coenobita* were not uncommon in horse-dung in an outlying field on May 7th, but I failed to find *O. nutans* and *nuchicornis*, for which Chingford is given as a locality by Fowler. On May 14th, at the sandy sides of a damp, rushy hollow, I found a single *Notiophilus rufipes*, and subsequent visits produced several more specimens; it was here associated with *aquaticus* and *palustris*, as well as with *biguttatus*. One hot afternoon in July, when insects were scarce and nothing of any value had rewarded a two hours' search, I came across a half-rotten but still living hornbeam, and on tearing off a large flake of loose wood, discovered a rather small but very active beetle beneath it, which proved on capture to be *Mycetochares bipustulata*. I do not know for certain whether this species has been previously recorded from the Forest, but think not. Amongst other things obtained by searching under bark were *Rhinosisius ruficollis* and *Tetratoma fungorum*, both in fair numbers, the latter not only in old and mouldy, but also in very fresh, white fungus. In addition to these, single specimens of *Cerylon ferrugineum* and *Triplax russica* put in an appearance, the latter being a species I had long looked for, and was very glad to get; it was found wrapped round by a spider's mesh in a large fungus, swarming with *Dacne rufifrons*, on beech. Finally, Mr. Donisthorpe, who accompanied me on a visit in mid-December, found amongst other good things a single *Triphyllus suturalis*.—F. B. JENNINGS, Edmonton. January 1st, 1899.

ACANTHOCINUS (ASTYNOMUS) AEDILIS NOT AT CHESTER.—My attention has been called by Mr. Tomlin to a slip in my "Notes on the Longicornes," where (*ante*, vol. x., p. 270) I note this species as having been taken at the "Chester docks." It should read "Cardiff docks."—H. ST. J. K. DONISTHORPE, F.Z.S., F.E.S., 7, Phillbeach Gardens, South Kensington, S.W.

CLYTUS MYSTICUS AT CHESTER.—*Clytus mysticus* is taken annually at Chester near the town, in a particular lane, where it breeds in palings and old hawthorn stems. The black aberration is also found.—B. TOMLIN, B.A., F.E.S., Llandaff.

MELANIC FORMS OF CARABIDAE IN THE NEW FOREST, INCLUDING CARABUS NITENS AB. NIGER, SEMENOW, AN ABERRATION NEW TO THE BRITISH LIST.—In June, 1895, I took a melanic form of *Carabus nitens*, L., in Denny Bog, in the New Forest. It was a female, and a male of the type form was *in copula* with it. I find it agrees in every particular with the ab. *niger*, Semenow. He describes it as follows in *Horae Societatis Entomologicae Rossicae*, 1886, xx., p. 234:—"Eadem cum typico statura et habitu, sed supra totus fere nigrescens, prothorace leviores, linea media bene distincta, limbo prothoracis elytrorumque vix aurato, costis rufo-ferrugineis postice in tuberculis resolutis, intervallis rugosis, vix ad latera viridi-micantibus. ♀ Specimen unicum. Arkangel." I took the same day, also in Denny Bog, a black form of *Carabus arvensis*, F. In 1897 I captured a black *Pterostichus dimidiatus* in the New Forest.—HORACE DONISTHORPE, F.Z.S., F.E.S., 7, Phillbeach Gardens, South Kensington, S.W.

PRACTICAL HINTS.

Field Work for Spring Months: March—May.

By J. W. TUTT, F.E.S.

1.—At the end of March and early April, kick sharply the stems of young aspens; look carefully at everything that falls from the branches. In this way *Brepheos notha* is to be obtained, in the afternoon.

2.—Larvæ of *Thera variata* should be beaten for in late March and early April.

3.—Hybernated larvæ of *Phorodesma smaragdaria*, very much like a little bunch of withered leaves, may be obtained by searching *Artemisia maritima* in April and May.

4.—In April and May the young leaves of burdock will often show the little round holes made by the feeding larvæ of *Aciptilia galactodactyla*, which hide on the undersurface of the leaves and are well protected by their pale greenish-white colour.

5.—The ova of *Lobophora viretata* should be searched for during the last week in April on the terminal shoots of holly at the tops of trees bearing flowers (Tunaley).

6.—In late April collect the heads of coltsfoot (*Tussilago farfara*); tie up in linen bags; you will breed *Platyptilia gonodactyla*.

7.—The larva of *Sesia cynipiformis* is to be found in April (and May) between the bark and solid wood of oak stumps, and spins a small cocoon before pupating, which may be found by pulling off the bark.

8.—The larvæ of *Sesia culiciformis* are to be found in two-year-old birch stumps; those cut down in the winter of '97-98 will be found to contain larvæ in April, 1899. It feeds just under the bark, in the wood, but the large quantities of frass thrown out between the wood and bark leave no room for doubt where this species is to be found.

9.—To find whether an alder contains a larva of *Sesia sphegiformis*, bend over the branches carefully to see whether the bark cracks, then gently raise the bark. If there be a round hole, it is almost sure to contain a *Sesia* larva or pupa. The branch must then be cut, low down, and the stick kept in damp sand. The month of April is the best time to find the larvæ.

10.—During the last fortnight of April look out for drooping or faded leaves of striped grass in gardens. Gently pull the infested shoot from the bottom, and in the stem the larva of *Apamea ophiogramma* will be found.

11.—On April 27th I swept 27 larvæ of *Ayrotis agathina*, and a few days afterwards hundreds more (Norman).

12.—At the end of April the oaks give larvæ of *Boarmia roboraria*, *Hylophila quercana*, and *Phorodesma baiularia*.

13.—At the end of April the trunks of birch trees should be searched for *Lophopteryx carmelita*.

14.—“Sugar should always be applied to the trees before sunset, and, when practicable, it should be put on warm, as the scent is much more powerful than when it is applied cold. The greatest number of moths will generally be found about three-quarters of an hour after sunset. Many species visit the sugar about an hour before sunrise in the morning” (H. Doubleday).

15.—The catkins of sallow should be collected just as they are com-

mencing to go over and put in handboxes. Among other species, *Citria fulvago* (cerago), *C. flavago* (silago), *Eupithecia tenuiata*, and *Grapholitha nisana*, are sure to be bred.

16.—The larvæ of *Apamea unanims* hibernate and spin their cocoons in April. These may be found under decayed bark on willows, in stems of thistles, burdock, teasle, or, in fact, anything that affords sufficient concealment.

17.—The larva of *Acrolepia perlepidella* mines the lower leaves of young plants of *Inula conyza* in April and the beginning of May, completely hollowing them out until they become mere brown bladders mottled with scattered excrement (Grigg).

18.—During April and May the larvæ of *Gelechia viscariella* are to be found in the tops of *Lychnis*.

19.—The larva of *Retinia turionana* feeds early in April in the central shoot of Scotch fir (*Pinus sylvestris*), clearing out the centre. The larva of *R. pinivorana* occurs in the same foodplant a fortnight later, preferring, however, the side shoots to the central one.

20.—The imagines of *Amphysa prodromana* fly during the late morning and early afternoon sunshine amongst *Calluna vulgaris* and *Vaccinium myrtillus* in April. Towards three or four o'clock they settle on the tips of the twigs, and at this time, too, the females may be found frequently in cop.

21.—In April the pupæ of *Ephippiphora pflugiana* may be obtained from thistle stems.

22.—The roots of *Artemisia vulgaris* should be collected in April for *Ephippiphora foeneana* and *Dichrorhampa simpliciana*.

23.—The larva of *Chrosis rutilana* feeds in a slight web on the shoots of juniper in April and May.

24.—Roots of *Centaurea nigra* collected in April will produce *Xanthosetia zoegana* in July.

25.—At the end of April the swollen roots of *Stachys palustris* should be collected for the larvæ of *Orthotaenia antiquana*.

26.—The roots of sorrel collected at Folkestone in April give larvæ of *Sesia chrysidiformis* and *Scoparia ingrattella*.

27.—The larva of *Geometra papilionaria* must be searched for on birch trees in April. It exactly resembles a birch catkin at that time of the year, and all suspicious-looking catkins should be carefully examined.

N.B.—For similar series of "Practical Hints" for these months see vols. x., pp. 77-79; ix., pp. 67-68; iv., pp. 78-79; ii., pp. 44-45.

ORTHOPTERA.

On the Abbreviation of Organs of Flight in Orthoptera.

By MALCOLM BURR, F.Z.S., F.E.S.

On looking through a good representative collection of Orthoptera from any region, probably the first thing that will strike the casual observer is the large number of species in which the organs of flight are absent, rudimentary, or at least quite useless for lifting their owners into the air. This degeneration of the wings is also quite noticeable in other orders, above all, in the Rhynchota, but in no case is it carried to such an extreme as in the Orthoptera. There are not only genera, but whole families which are incapable of flight, and it

often occurs that, while the male is a good performer in the air, the female, by reason of greater size and smaller wings, is unable to raise herself from the ground. Often, too, we find dimorphic species, which seem to be perfectly indifferent to the possession of wings, living equally happily with or without these organs. It is by no means a rare occurrence to find a specimen of a normally winged species with rudimentary wings, and *vice versa*.

Broadly speaking, Orthoptera are large insects; that is to say, the smallest known species would seem gigantic compared with certain minute beetles, while some Phasmidae, Acridiidea, and Locustodea are among the largest insects known. As well as being large, they are also heavy, with the natural result that they require more powerful wings to support them; further, it is only the hinder pair or true wings, which are used for propulsion, as far as we can tell, for the anterior pair or elytra are hard and coriaceous, and can be of little use to drive the insect through the air, though they may act as inclined planes. It is a general rule, also, in Orthoptera, that the females exceed the males in size, in some cases very considerably. In *Caloptenus italicus*, for example, the female is nearly three times as large as the male, and in *Oedipa*, *Stethophyma*, *Stenobothrus*, and very many other genera the same fact is noticeable. Now, as the female increases in size, so the elytra and wings diminish, varying in inverse ratio with the magnitude of the creature. In *Mastax nigra*, Gilio-Tos, the male is a small and fully winged insect. In the female, the wings are scarcely less in size, but the insect itself seems to have outgrown its wings, for, in the specimens now before me, they are far too weak and small to lift the owner into the air. The male, I should imagine, is a very fair flyer.

It would be reasonable to deduce from this evidence, that in some cases the males, being the more active animals, would search out the females, that is, unless they possess the power of stridulation with which to entice their spouses to the marriage ceremony, but we have too few observations to corroborate the fact.

The great majority of Orthoptera are more or less sedentary in habits. The *Forficularia* rarely fly, but spend the day hiding in dark corners, seeking their food at night, and, being very rapid runners, have little occasion to use their wings. The same remark applies to the cockroaches. The *Mantodea* are, from all accounts, chiefly sluggish creatures, which wait to snare their prey, though sometimes they fly in the evening. The *Phasmodea* too, seem only to use their wings as parachutes, relying on their coloration and their spines to protect them from their enemies. The best flyers are to be found in the *Acridiidea*, for to this group we refer the great migratory locusts, with their well-developed wings and voluminous air-sacs. But the smaller species seem to use their wings solely for flying short distances, twenty or thirty yards at the most. The winged *Locustodea* scarcely fly more than a dozen yards, and the crickets very rarely fly at all. The result of these more or less sedentary habits, is that the wings gradually lose their importance to their owners, for procuring food, or for escaping from their adversaries.

But although there are so many apterous forms in Orthoptera, the elytra at least, in the saltatorial groups, are often retained for purposes of stridulation, long after they are too diminutive for flight.

We see this process half completed in the genus *Platycleis*, in which there are some fully-winged species, some with wings too short, to be used for flight, but with the elytra retained for purposes of stridulation, though this primarily affects only the males, and a few species again which are normally hemipterous, but are occasionally found macropterous. I find from the careful measurement of 28 species of this genus that 10 only have the elytra longer than the body, viz.:—*Platycleis grisea*, *P. intermedia*, *P. laticauda*, *P. affinis*, *P. tessellata*, *P. stricta*, *P. montana*, *P. brachyptera* var., *P. roeselii* var., and *P. bicolor* var., whilst *P. vittata* and *P. brachyptera* (type) have the elytra of almost the same length as the body, and *P. roeselii* (type) and *P. bicolor* (type) have less than half the wing-length of their respective varieties. Those with the elytra shorter than the body are *P. orina*, *P. nigrosignata*, *P. incerta*, *P. sepium*, *P. modesta*, *P. decorata*, *P. raia*, *P. prenjica*, *P. saussureana*, *P. fusca*, *P. roeselii* (type), *P. domogledi*, *P. oblongicollis*, *P. marmorata*, *P. angustipennis*, and *P. bicolor* (type).

It will be seen that the majority of species have elytra considerably shorter than the body, and in seven cases only are these organs longer than the body, if we exclude the rare macropterous forms of three species which are occasionally found. The elytra are longer in the females than in the males in *P. grisea*, *P. intermedia*, *P. laticauda*, *P. modesta* and *P. fusca*.

In the allied genus *Thamnotrizon* the wings are absent or abortive, and the elytra are retained in the male, solely for purposes of stridulation, being represented in the female merely by two lateral flaps or lobes.

In the *Ephippigeridae*, no known species can fly. There are three genera: *Pycnogaster* contains six ponderous species with mere vestiges of elytra; *Platystolus* contains four similar species, while the genus *Ephippigera* contains over fifty species. In all these, the elytra are equally developed in both sexes, useless for flight, but retained for stridulating. This genus is further remarkable, in that the female can stridulate as well as the male, and that the insects chirp when angry or frightened, as much as on any other occasions.

As to dimorphic forms, in *Platycleis brachyptera*, L. and *P. roeselii*, Hagen, there are well-known, but rare, forms, which are macropterous; in *Podisma* too, macropterous forms occur. Of *P. alpinum*, there is a recognised form, more eastern in distribution, in which the organs of flight are nearly as long as the abdomen, which seems curious, for they do not appear large enough to support the heavily-built insect in the air.

(To be continued.)

EXOTIC LOCUSTID AT KEW.—I have received from Kew Gardens a specimen of an exotic Locustid, which Mr. Burr has identified as *Copiophora brevisrostris*, Stal, one of the *Conocephalidae*. It is a South American species, and probably came over in the oval stage, to be hatched in England. It was found on the underside of an unnamed aroid, but the leaf did not appear to have been eaten. It is a large pale green insect, with a prominent fastigium, pale green in colour, with fully developed elytra and wings, and a long ovipositor. The face is ornamented with a large black patch in the centre, with a bright orange spot beneath it. Total length, 85mm.; length of ovipositor,

46mm.; of antennae, 55mm.; expanse of elytra, 86mm.—W. J. LUCAS, B.A., F.E.S., 4, Minerva-road, Kingston-on-Thames. February 11th, 1899. [The occurrence of this exotic at Kew is very interesting, and is a notable addition to our foreign visitors that occur there. The specimen does not correspond exactly with Stal's description of *C. brevirostris*, but differs only in some minor details of colour.—M.B.]

APTERYGIDA ALBIPENNIS, MEG., IN NORFOLK.—With reference to my note on *Apterygida albipennis*, Meg. (ante p. 50), Mr. James Edwards has kindly written and sent for my inspection an undoubted pair of this rare species, taken by him near Norwich some ten years ago. This is a most interesting record, and Norwich is, I believe, the most northerly point at which it has been captured.—M. BURR, F.Z.S., F.E.S., New College, Oxford.

THE MIGRATION OF LOCUSTS.—I am not quite satisfied that all the records of locusts in England are true cases of migration; many undoubtedly are brought to our coasts on ships. In 1898, when *Schistocerca peregrina* swarmed in Algeria, many flew on board homeward-bound vessels, and I was informed by Mr. Royal that from one that entered Nelson Dry Dock, Rotherhithe, for repairs, considerable numbers of dead specimens were swept. During the passage up-channel many might have been strong enough to reach the land, and so have furnished records for our southern counties.—HARRY MOORE, F.E.S., 12, Lower-road, Rotherhithe. February 20th, 1899. [I have received from Covent Garden examples of *Acridium aegyptium*, undoubtedly imported in vegetables from Southern Europe.—M.B.]

SCIENTIFIC NOTES.

COLOUR-CHANGE IN THE ADULT LARVA OF *SCOLIOPTERYX LIBATRIX* JUST PREVIOUS TO PUPATION.—Dr. Chapman has discussed (*ante*, vol. x., pp. 116-118) the blackening of the exposed extremity of the larva of *S. libatrix* before pupation. He does not mention the, to me, obvious function of this unusual pigmentation. *S. libatrix* has a slender, light-green larva, admirably adapted to escape observation while stretched out on its food-plant. It spins a peculiar cocoon, the extremity of which is widely open, thus exposing plainly to view the end of the larva. The blackening ensues at once on the exposed portion, and thus renders the larva inconspicuous during the period before pupation. Many other larvæ assume various changes in coloration during the period of leaving the food-plant. *Eudeilina hermidata*, normally green, becomes bright red: *Heterogenea shurtleffii* loses all its pigment and becomes transparent; *Polygrammate herbraicum*, normally green, assumes a marked and complicated pattern of lines and spots. *Scoliopteryx libatrix* differs in the time of appearance of the coloration, the purpose of which seems the same, namely, to render the larva inconspicuous in its usual environment at the critical period preceding pupation.—HARRISON G. DYAR, Ph.D., National Museum, Washington, D.C.

The Editor has handed to me Dr. Dyar's note on *Scoliopteryx libatrix*, with a request for my remarks thereon. Some lexicographers are said to have proposed to define a crab as "a fish that swims backwards," and this definition was highly approved by an eminent naturalist, for three reasons—that a crab is not a fish, that it does not

swim, and does not travel backwards. Now I think Professor Dyar's explanation of the coloration assumed by the larva of *S. libatrix* before pupation is most obvious, simple, and generally admirable. Firstly, because *S. libatrix* spins quite a close cocoon in which the larva is invisible (it may have acquired less exclusive habits in America). Secondly, it does so by drawing together green leaves in which black coloration would make it more conspicuous, and thirdly, the black marking is very restricted and does not affect the anterior extremity of the larva.

The blackening does not ensue at once, but only after the cocoon has been completed, it has a very restricted area, related obviously to the imaginal wings, and is probably related to the impending change to a black pupa. I incline to think it is an inevitable result of this pupal coloration in some way, probably in that I have suggested, and if it has in itself any useful function it cannot be that advanced by Dr. Dyar. It is of quite a different character from that which is so common in green tree-feeders that bury in the ground and often have an intermediate period of wandering on the ground, as is the case in most of our Sphingids, some Notodonts, &c., useful protectively, but physiologically no doubt associated with the loosening of the larval epidermis and the growth of the cells to form the pupal covering—a separation of the larval epidermis, a beginning of its definite decay and change of colour as a result. A separation of the immediately underlying coloured tissues, and other changes may be elements in the result, but a definite development of pigment is not one of them, as it is in *S. libatrix*.—T. A. CHAPMAN, M.D., F.Z.S., F.E.S., Betula, Reigate.

HYBERNATING STAGE OF *PYRAMEIS CARDUI*.—An interesting item concerning *Pyrameis cardui* is recorded by Eaton in the *E.M.M.*, p. 42, where he notes that "near the mouth of the river Axe, on December 30th, in the afternoon, he saw a much worn *P. cardui* disporting itself along the sunny side of a wall, and three others on the cliffs at Seaton on January 2nd." The Editors consider this an "unprecedented record," and, further, that "they can scarcely have been other than individuals aroused from hibernation by the prevailing warm weather," also that "they teach us how little we know about the hibernating habits of the insect in this country." They add: "We cannot call to mind anything on the subject save Mr. J. H. Carpenter's note *E.M.M.*, vii. (2nd ser.), p. 279." There appears to be no evidence except Mr. Carpenter's record of having seen a female example, three or four years previously on the Sunday preceding Christmas-day, in cold weather, between the two overlapping pales of an oak fence in the Valley Road, Streatham, which, although sluggish at the time, quickly revived, and died a few days afterwards—that the insect hibernates in the true sense in this or any other country, and it would appear that the *P. cardui* observed by Mr. Eaton were doing what the winter survivors do normally during December-February in southern Europe. There has been, I believe, no frost yet this winter (1898-9) in Devonshire (in London there have not been more than half-a-dozen frosts, and these not more severe than one can often experience in the Alps at 5,000ft. in mid-August after a brilliant day). Whilst agreeing that we know but little about the hibernating habits of the insect in this country, we would further suggest that the following notes have something "to do with the subject"—*Ent. Record*, vii., pp. 110-111; viii., pp. 203-204;

ix., p. 251—where such facts as were known and such observations as had then been made were collected and published.—J. W. TUTT, Westcombe Hill, S.E. February 1st, 1899.

THE RELATIONS OF *Lasius americanus* AND *Aphis prunicola*.—In 1890 Dr. E. F. Smith noticed (*Ent. Amer.*, vi., pp. 101-108, 201-207) that *Lasius claviger* was intimately connected with *Aphis prunicola*, and although he did not observe the act, he strongly suspected that the ant brought the Aphids from below ground in the spring and placed them upon the twigs, thus more or less directly causing their diffusion in peach orchards. Mr. Webster has now published (*Can. Ent.*, xxxi., p. 15) some observations on *Lasius americanus*, which he noticed attending carefully the same species of *Aphis* on peach roots, but he also witnessed the ants transporting the Aphids from one twig to another, although not able to detect one carrying the *Aphis* from the roots to the branches. He further notices that *L. americanus* burrows near the bases of young peach trees, choosing the part nearest the tree where the ground is heavy, and sometimes even gnawing the tender bark. The *Aphis*, below ground, clusters round the most tender rootlets, the ants, which are in constant attendance, at once removing the Aphids as soon as they are exposed. In some places patches of bark had been removed, and the wounds were being covered with a thin growth of new bark, on which the Aphids were closely packed, the latter living on the newly-forming bark, and being collected along the edges of the wound precisely as *Schizoneura lanigera* congregates on the newly-forming bark of apple where wounds have been caused by pruning. Webster considers that *Lasius americanus* intentionally gnaws the bark on the roots to furnish a supply of food for *Aphis prunicola*, whenever there is a lack of tender rootlets for the purpose.—J. W. TUTT. February 1st, 1899.

THE NOMENCLATURE OF BRITISH BUTTERFLIES.—The constant changes which are made in the nomenclature of British butterflies is very puzzling to young entomologists, and tend to great confusion. Personally, I hold the opinion that it is impossible to apply the rules of priority strictly, and that it is much better to use a specific name long applied, and generally known to continental, as well as British, entomologists, than to attempt to make changes on account of doubtful and often trivial questions of priority or identification. Mr. South has given in the *Entomologist*, February, 1899, a list which seems to me to be more generally correct than any other, and I think it would be well if a committee of British lepidopterists were appointed to settle the nomenclature of the Lepidoptera, as the British ornithologists have done for the British birds. I am induced to write this partly because, in looking over the re-arrangement of the genus *Colias* at the British Museum lately made by Mr. Butler, I see some changes which I do not suppose he or anyone else will attempt to defend. *C. edusa* is called *C. hyale*, and is united with the African *C. electra*, whilst *C. hyale* has got a new name, which I would not repeat even if I could remember it. Mr. Kirby again, on *Entomologist*, p. 31, uses the name of *Chrysophanus turcicus*, for *Chrysophanus phlaeas*, thus obscuring two facts which I think he will not dispute. Mr. South's list shows that three such careful workers as Messrs. Barrett, Meyrick, and Tutt cannot agree as to the right names to use for some of our common species, and none of them agrees with Standinger, whose

specific names are, with very few exceptions, almost universally used out of England. I fully believe, however, that if these three gentlemen would meet two or three others who desire to see uniformity, an agreement could be arrived at. I suggest that the Entomological Society should nominate a committee for the purpose, to begin with butterflies. If successful, the process might be continued with moths, and a list printed for labelling. I am quite willing to accept Mr. South's specific names with the following changes: *Janira* for *Ianira*, *Tiphon* for *typhon*. With regard to the generic names, however, there will be some difficulty, as it is evident that some of those used by him and Standinger require alteration, although I cannot follow any of the authors' reasons for the generic names they have adopted. I am sure, however, that before one begins cutting up the old genera one must study the whole of them thoroughly, and even then it will be found that it is hard, if not impossible, to say what constitutes a generic difference.—H. J. ELWES, F.R.S., F.Z.S., F.E.S., Colesborne, Gloucestershire.

NOTES ON COLLECTING, Etc.

LAMPIDES BOETICA REPORTED FROM WOOLWICH.—At the last meeting of the North Kent Natural History and Scientific Society a specimen of *Lampides boetica* was exhibited by Mr. Cecil J. Brooks; the blue was in perfect condition. Mr. Brooks has since forwarded me details of its capture, which are as follows: On September 29th, 1898, the mother of Mr. Brooks observed the insect in the drawing-room of their residence at 25, Wood-street, Woolwich. The lady fortunately was very careful in effecting its capture without damage. Mr. Brooks is of opinion that it flew in at the French windows, which were open at the time.—H. J. WEBB, 3, Gunning Street, Plumstead. January 27th, 1899. [Does Mr. Brooks suggest "French windows" as a joke?—ED.]

NOTE ON SPRING LEPIDOPTERA IN THE RIVIERA.—Arriving here on February 18th, we found that the previous day had been stormy, with abundant rain; the weather has since been sunny and rainless, the 20th especially was a fine, warm, calm day, and brought out more butterflies than have since been seen, there being a certain crispness and coolness in the air, although the sky is clear and sunshine abundant. The almond trees, which are just coming into bloom at Avignon, are here rather past their best. The mimosas are out fully, and make a grand mass of colour, as are many other of the cultivated plants. The native vegetation is still rather quiescent. Daisies are in full blossom, and the blackthorn is in flower, whilst in warm corners the *Cytisus triflorus* and *Lavandula stachas* are already flowering freely, as are various garden weeds; there is, nevertheless, still a wintry aspect amongst native plants. The processionary caterpillars (*Cnethocampa pityocampa*) are rather common this year, and on the lower levels have already abandoned their nests to search for a place for pupation. Though now somewhat altered and weathered, their egg masses when wreathed round the base of a terminal leaf of *Pinus pinarta* pass very well for an additional bud at the end of the branch. Of hibernated butterflies, *Pyrameis atalanta* is much the most abundant, being really quite common, much more so than in 1897. *Vanessa io* and *Aglais urticae* are also to be seen, but rarely. *Pyrameis cardui* is frequent,

always worn. Of spring emergences, *Pararge megera* ♂ is already common, and *P. egeria* has been several times seen, even quite in Cannes. *Pieris rapae* ♂ is common when the day is warm, but is not yet in full force. *P. brassicae* ♂ was also taken. On the 20th and 21st several *Colias edusa* were taken, the males very fresh, small, and rather well marked; one ♀ appeared to be intent on oviposition and was not in such good condition as the ♂s. There is no sign of *Gonepteryx cleopatra* in any of its usual haunts, though *Cyaniris argiolus* is already out, nor is *Anthocaris belia* yet on the wing. *Charaxes jasius* larva is nearly full grown in its penultimate stage.—T. A. CHAPMAN, M.D., F.E.S., Cannes. February 24th, 1899.

CURRENT NOTES.

In the January number of the *Ent. Mo. Mag.*, Mr. Champion raises the question of *Phytosus balticus*. Kraatz, and *P. nigriventris*, Chave, being distinct species. Canon Fowler dropped the latter, as he considered them both forms of one species. Mr. Champion points out how they differ, and that *P. nigriventris* should be reinstated in the British list.

Mr. W. E. Sharp records (*F.M.M.*, February) *Chaetocnema sahlbergi* in the tidal drift on the banks of the Conway. Mr. B. Tomlin also records three specimens of *Philonthus pullus* taken by himself in July last at Bridgend running on the sand. Mr. G. Elliman has taken *Brachysomus scitulosus*, Boh., at Chesham in some numbers; whilst Mr. E. C. Bedwell records *Cryptocephalus exiguus*, Schneid., from Oulton Broad, where he took it by sweeping in June last.

Webster records (*Can. Ent.*, xxxi., p. 4) that *Aspidiotus perniciosus* gives off an odour that can be distinguished at a considerable distance, a badly-infested tree being readily detected a yard away. It is supposed that in its native home the odour might attract other insects and thus afford a means of diffusion not at present available in America.

Professor Aurivillius (*Ent. Tidskr.*, xix., pp. 61-64) disputes Kirby's conclusions regarding the identification of *Colias (Eurytmus) hyale*, L., (*Handb. Lep.*, ii., 214), on these grounds: 1st, that "flava" and "lutea," with Linné, apply well to the colour of our paler species, &c.; 2nd, that the words, "nigredine fascia quasi lutea in duas partes dissecta," manifestly do not apply to any form of *edusa*, Kirby's reading of them being inadmissible; 3rd, that when (in 1758) Linné wrote "Hab. in . . . Africa," he had not yet received any consignment from S. Africa, and cannot, therefore, allude to *electra*, but must refer to N. Africa, where *hyale*, Auct., really occurs. He therefore gives the corrected synonymy as follows:—

Colias hyale, Linn., "Sys. Nat." xth ed., p. 469 (1758); "Fauna Suec." p. 272 (1761); God., "Enc. Meth." ix., p. 99 (1819); Bdv., "Sp. Gen. Lep." i., p. 650 (1836). *Paluena*, Esp., "Die Schmett." i., p. 68, pl. 4, fig. 2 (1777); Hb., "Eur. Schmett." figs. 438-9 (1798-1805). *Kirbyi*, Lewis, "Disc. Law of Priority" (1872); Kirby, "Handb. Lep." ii., p. 215, pl. 61, figs. 1-2 (1896).

Colias electa, Linn., "Cent. Ins." p. 21 (1763); "Amoen. Acad." vi., p. 405 (1768). *Electra*, Linn., "Sys. Nat." ed. xii., p. 764 (1767). Var. *Croceus*, Fourcroy, "Ent. Paris." ii., p. 250 (1785). *Hyale*, Esp., "Die Schmett." i., p. 71, pl. 4, fig. 3 (1777); Hb., "Eur. Schmett." figs. 329-331 (1798-1803). *Edusa*, Fab., "Mant. Ins." ii., p. 23 (1787); God., "Enc. Meth." ix., p. 101 (1819); Bdv., "Sp. Gen. Lep." i., p. 638 (1836), &c.

At the meeting of the Entomological Society of London, held February 1st, Mr. G. C. Champion showed numerous specimens of both sexes of an undescribed species of *Apimernus* (Family *Reduviidae*) found by himself in Chiriqui, and pointed out some of the more interesting peculiarities of each sex. In the female of this insect, the last connexival segment of the abdomen has a long bright red foliaceous appendage on each side, movable at the will of the insect, these appendages in the male being shorter and connate, forming a broad plate round the apex of the abdomen. The females, which have the ventral segments closely pilose and the hind tibiae furnished with a short dense brush of hairs on the upper edge, have the power of exuding a viscous liquid from the ventral surface (possibly from the hairs) and perhaps from the tibiae also, by which they are enabled to hold their prey while in the act of sucking it. Mr. Champion said he had observed the *Apimernus* attacking soft freshly emerged *Longicornes* nearly as large as itself. The males have a shorter brush on the hind tibiae, and the ventral surface sparsely pilose.

C. S. Gregson, of Liverpool, one of the last of the old school of Lancashire collectors that did so much towards the elucidation of the life-histories and habits of our Micro-lepidoptera some 50 years ago, died at the commencement of February, and was buried on the 6th. That he was a keen collector goes without saying, and that he added many facts to our knowledge of several obscure species is well known to all lepidopterists. It would be well if some of our younger collectors, who are spending their time and money in duplicating collections of the larger species of lepidoptera, could be persuaded into putting their energy into the field work necessary to clear up the difficulties attending the life-histories and habits of the species in some of the more obscure groups and the accumulation of specimens belonging to these groups. It was the keen rivalry existing between the observant field-naturalists that Lancashire produced in the "fifties" and those belonging to our southern counties, of whom Stainton was the acknowledged leader, that brought about such a rapid extension of our knowledge at that period, and resulted in an accumulation of material that has never since been equalled. Of the many observations that were then made on the Micro-lepidoptera more than a fair share must be put down to the account of the hardworking lepidopterist who has so recently died.

At the meeting of the Cambridge Entomological and Natural History Society on February 3rd, Dr. Sharp exhibited a number of *Lucanidae* from various parts of the world, and called attention to the conspicuous trimorphism apparent in the males of many species. These differ not only in size but also in the form of the mandibles, and can be usually placed in three well-marked groups in each species. He also exhibited some bees of the genus *Koptorthosoma* from Ceylon, in which, in the female, a cavity is formed in the anterior end of the abdomen by an involution of the skin. The abdomen is pressed so close against the thorax that, in the normal position, this cavity is invisible, but it can be seen by bending down the abdomen or by cutting it off. The cavity varies in form in different species, but is found throughout the genus in the female, and always contains a number of large *Acari*. It is not known whether these parasites have any connection with the development of the structure in question.

At the meeting of the Entomological Society of London, held February 15th, Mr. B. A. Bower exhibited perfectly black, melanic examples of *Boarmia abietaria*, Hb., bred from ova laid by a female of the ordinary Box Hill form, which was captured on July 9th, 1897. They were part of a brood of seventeen, seven of which were of the black aberration; and for comparison with them, he showed specimens from Box Hill, South Devon, and the New Forest.

At the same meeting Mr. Blandford exhibited some lumps of common salt burrowed by larvæ of *Dermestes vulpinus*, to which he had incidentally referred in a letter just published in *Nature*. They were sent to him by Sir H. T. Wood, Secretary of the Society of Arts, who received them from a correspondent writing from a preserved-meat factory in Australia. It was a mistake to suppose, as this correspondent had done, that the larvæ burrowed in the salt for the sake of obtaining food; he himself had on various occasions called attention to the depredations of *Dermestes vulpinus*, arising from a habit the larvæ had of burrowing through different materials in order to find a shelter in which to undergo pupation, though this was the first time that salt, as a substance attacked in that way, had come under his notice. Mr. J. J. Walker, in remarking upon the exhibit, said he believed one of the earliest references to injuries caused by *Dermestes* was to be found in "The last Voyage of Thomas Candish," published in Hakluyt's *Collection of Voyages*, where there was an interesting, though somewhat exaggerated, account of certain worms which, bred from a stock of dried Penguins, proceeded to devour the whole of the ship's stores and then to gnaw into the timbers, creating great alarm lest the ship should spring a leak. This voyage took place in the year 1593; and the worms he thought could only have been the larvæ of *Dermestes vulpinus*, or some closely allied species.

At the meeting of the City of London Ent. Society held on February 21st, a hearty vote of thanks was passed to Mr. H. Massey, F.E.S., of Didsbury, Manchester, for an exceedingly generous donation towards the publication fund of that society.

From the Report of the Council of the Entom. Society of London for last year, it appears that during 1898 the society lost three Fellows by death and eight by resignation, while three Honorary Fellows and thirty-four Ordinary Fellows were elected. This is the largest addition to the society's ranks in any year, except 1886, when thirty-five were elected, several of whom were, however, old members who became Fellows when the Society obtained its Charter. The number of Fellows now stands at 424, of whom twelve are Honorary. The *Transactions* for the year form a volume of 444 pp., comprising twenty-two papers, contributed by nineteen authors, and illustrated by nineteen plates. The library had been largely augmented during the year by the bequest of the late Mrs. H. T. Stainton of such books in her husband's large entomological library as were not previously in the society's possession. The editorial staff of the *Ent. Record* obtained, perhaps, rather more than its usual share of Fellows, and have already made a good start for the present year. We consider that every reader of this magazine should be a Fellow of the Entomological Society of London, and a member of the South London and City of London Entomological Societies.

REVIEWS AND NOTICES OF BOOKS.

ORTHOPTEREN DES MALAYISCHEN ARCHIPELS, GESAMMELT VON PROFESSOR DR. KÜKENHAL IN DEN JAHREN 1893 UND 1894, BEARBEITET VON BRUNNER VON WATTENWYL, UNTER BERÜCKSICHTIGUNG NEUER VERWANDTER SPECIES, with five Plates. Frankfurt. 4to. 1893.—This is one of the works dealing with the zoological material collected by Professor Dr. Kükenhal in the Moluccas and Borneo in his memorable voyage. The author gives a list of the species taken in each locality, and proceeds to describe the novelties, excepting the Phasmatodea, which are omitted, being retained for the monograph of that group which the illustrious orthopterist holds ready. Many other groups are treated monographically, and many revised. Of the genus *Phyllanthromia* no less than thirteen new species are described, figured and fitted into the existing system with a synoptical table. Of *Hierodula*, nine new species are treated in the same way. A monograph of Asiatic Mastacidae is included, but is barely complete, and needs the modification given in my work on the Mastacidae, which is not yet published. For instance, I do not doubt that several entomologists will disagree with the treatment of the genus *Choroetypus*. As a basis for classification, he has chosen the "hypertelic" mirrors of the pronotum, which, so far from being a stable specific character, appear to vary in the same species. Two allied genera are characterised, with three new species. The remarkable genus *Gomphomastax* is erected with two new species from Kashmir and Punjab. A month later in Zubowsky's work, Krauss described two others, making a new genus *Parerucius*, which coincides with *Gomphomastax*, and so must fall. It is the only genus of Mastacidae with long antennæ, and which occurs in the Palaearctic region. Many new genera and species of Acridiidae are also treated, as also in the Locustodea. To *Diaphebus*, Karsch (*Mecopodidae*), four new species are added and seven new *Phyllophora* are described. The species figured by Wallace in the "Malay Archipelago" is shown to be *Hyperomala virescens*, Boisd. (described also by Serville), and is well figured. The Conocephalid genus *Lobaspis*, Redt., is revised. Of the Gryllodea three new species are described, but no new genera. The work is illustrated by five splendid plates drawn by Professor Radtenbacher, figuring the majority of the new species described.—M. B.

UEBERSICHT DER LEPIDOPTEREN-FAUNA DES GROSSHERZOGTUMS BADEN UND DER ANSTOSSENEN LÄNDER, von Carl Reutti, 2nd edition. [Published by Gebrüder Borntraeger, Berlin, S.W., Schönebergerstrasse 17A. Price 7s.]—We are not surprised that this excellent annotated list, which runs out to 361 + xii, 8vo. pages, has reached a second edition. It comprises the whole of the Macro and Micro lepidoptera, and the following will give some idea of the richness of the fauna dealt with:—*Rhopalocera* 133 species; *Sphingids*, *Sesiids*, *Thyridids*, and *Anthrocerids* 58 species; *Nycteolids*, *Lithosiids*, *Arctiids*, *Cossids*, *Cochlidids*, *Liparids*, *Lasiocampids*, *Endromids*, *Saturniids*, *Drepanulids*, *Notodontids*, 135 species; *Noctuids* 403 species; *Geometrids* 330 species; *Pterophorids* 41 species; *Alucitids* 6 species; *Pyralidids* 187 species; *Tineids* and *Tortricids* 1,274 species. We observe that the arrangement is such that the *Choreutids*, *Glyphipterygids*, and

Ochsenheimerids lead up to the Tortricids, which open with the genus *Dichrorampha*, whilst many of the other associations are highly suggestive. To those who know *Die Kleinschmetterlinge der Mark Brandenburg*, we need only add that this is a worthy supplement, covering another large district, whilst to those who are studying the geographical distribution of our European insects the volume is positively indispensable. It should be in the hands of all working lepidopterists.

ZUR ACRIDIOIDEA-FAUNA DES ASIATISCHEN RUSSLANDS, par N. Zubowsky [Extrait de l'Annuaire du Musée Zoologique de l'Académie Impériale des Sciences du St. Petersbourg, 1898], pp. 1-48 (pp. 68-110), 8vo. St. Petersburg, 1898.—This is an important paper on this extensive Orthopteran group, elucidating its distribution in Asiatic Russia, a large and little-known collecting ground. Herr Zubowsky describes in Latin, writing generally in German. He enumerates 75 species, of which seven are new, with two new genera. Several old species of Fischer de Waldheim and Eversmann are redescribed, for example, *Stenobothrus fischeri*, Ev., *S. carbonarius*, Ev., *Gomphocerus variegatus*, Fisch. de W. (which he shows is the same as *G. livoni*, Azam., which latter name must therefore fall), *Bryodema gebleri*, Fisch. de W. Of the large genus *Stenobothrus*, 21 species are included, of which four are new. The new genus *Parerucius*, Krauss (*Mastacidae*) is the same as *Gomphomastax*, Br., a genus erected this year in a work published a month earlier. The other new genus is *Conophyma*, close to *Platyphma*. We observe that the author, unlike the majority of European authors, follows Scudder in accepting *Podisma*, as prior to *Pezotettix*. It is an extremely interesting paper and very useful.—M.B.

MARVELS OF ANT LIFE, by W. F. Kirby, F.L.S. [Published by S.W. Partridge & Co., 8 & 9, Paternoster Row, London. Price 1s. 6d.]—This is one of the most interesting little books on ants that we have read, and although the author says it "does not profess to be a scientific book," one can safely say that no one could buy a better work than this to obtain a general knowledge of the structure and habits of ants as a preliminary to a really scientific study of these insects. The book is divided into 16 chapters, each of which deals with some particular phase of ant life or habits: "Conditions of ant life," "The economy of an ant's nest," "Ants as architects," "Ants as agriculturists," &c. We observe in the chapter "Ants injurious to man," that "The foraging ants . . . sometimes devour drunkards." On the whole we should say that this part of the chapter should have been transferred to the preceding one—"Ants beneficial to man." The final chapter consists of a Bibliography, and includes the titles of the most important books and papers that have been written on ants. Whilst as an Appendix, a list of the ants mentioned in the book, with short notes of each species, is exceedingly useful. Altogether a most useful, well-written, and intelligently thought-out, little book, which is just popular enough to lead people who are not specialists on to the end, just scientific enough to interest all those who have a special knowledge, and to ensure that Mr. Kirby's intimate acquaintance with the literature of his subject, will give them some details that they have overlooked or almost forgotten.

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A Classification of Butterflies by their Antennae.*

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

The Editor of the *Entomologist's Record* has asked me to contribute a review of this important paper. I do so with pleasure, but also with regret that he has not placed it in more competent hands. The paper is one of great importance, since it records a large amount of careful and systematised work, and marshals the results so as to yield some very definite and valuable conclusions. The introduction to the paper promises us an equally full treatment of the morphology of all other parts of the exoskeleton of lepidoptera, in a series of papers of which this is the first. As this paper deals only with the antennae, and so even, the antennae of only the butterflies, the whole research when complete, if carried out as fully and accurately as the portion before us, will be immensely monumental both in size and importance. The author proposes to found a classification (of a provisional character) on the results of the examination of each separate organ, and by finally bringing these into line, come to a satisfactory result as to phylogeny and classification. In this introduction he recognises how much ahead of us the Americans are in these researches, but is a little too sweeping in denying the existence of any European books with valuable remarks on the morphology of lepidoptera.

There is first a reference to previous work on the antennae of butterflies, and especially to Bodine's paper (summarised in *Ent. Record*, viii., pp. 225 and 261). There is this difference between Bodine's work and that in the paper before us, that Bodine's work was to a great extent histological, and involved preparation of specimens and considerable magnification, whilst Dr. Jordan says that all his facts can be obtained without mutilating specimens, and by means of a hand lens. This is no doubt true, though I found it difficult to be sure of some items without the use of a compound microscope and some preparation of specimens, and fancy that Dr. Jordan could not be so confident as he justly is, about some of his facts, if he had not done so also. We miss a definite statement of the relative use of terms, since Dr. Jordan does not adopt the same terminology for the details of antennal structure as Dr. Bodine does, yet an increase of synonymy is as great an evil in morphology as in systematic zoology. Whether Bodine's

* "Contributions to the Morphology of Lepidoptera." By Karl Jordan, Ph.D. I. "The Antennae of Butterflies" (*Novitates Zoologicae*, vol. v., August 1898), pp. 45, 2 Plates.

or Jordan's names have priority from some previous author I do not know.

The organs of the antennae, which are the principal subject of Dr. Jordan's paper, he tells us, are:—

(1) "Scales, covering generally the dorsal surface of the antenna, but very often also developed ventrally, and in many cases absent."

(2) "Fine sense hairs," covering the not scaled portion of the antenna, or parts of it, varying much in length and width. These appear to be Bodine's sense hairs of 1st [and 3rd (?)] type, and some of his 2nd, possibly. They are not stated by either author to be special sensory, but many of their statements show that that is their belief.

(3) "Setiferous punctures," found especially at the sides of the joints in those families where the fine sense hairs are restricted in extent (*Nymphalidae*, *Papilionidae*). The puncture is generally rather conspicuous, the seta very short—there is no distinct line of separation between (3) and (2)." These appear to be the same as Bodine's "Pits" and "Rods" and the "Batonnets" of Chatin. They are also probably special sensory organs, Bodine clearly so considers them; as regards butterflies, since they are most abundant in the highest families, they are probably a more specialised organ than the "sense hairs." Dr. Jordan restricts himself to morphology, and makes no remarks, by the way, on function; but since the hairs and bristles are "sense" hairs, and "sense" bristles, and these merely punctures, one receives an impression, probably erroneous, that Dr. Jordan regards the punctures as sense hairs that are degrading and becoming functionless, rather than as a higher stage of their evolution. Bodine describes them as being as well supplied with nerves as the hairs.

(4) "Sense bristles, standing on the scaled and not scaled portion of the joint, varying much in length, often regularly arranged." These appear to be identical with Bodine's hairs of the 2nd type. Why Bodine (if this be so) intercalated these between his first and second type hairs somewhat puzzles me. On the butterfly antenna these "bristles" appear to be tactile rather than special sensory, and appear to be homologous with the ordinary tactile hairs of the surface elsewhere.

(5) "To these four special organs comes as a fifth feature of the antenna, the often peculiarly specialised configuration of the surface of the joints."

He then gives a description of the antenna in each family (or sub-family) of butterflies, and, as he tells us these descriptions are themselves summaries, it is difficult to abbreviate them without falling into inaccuracies, still an attempt to do so may lead others to refer to the paper itself for fuller particulars. I. *Hesperiidae*: A typically Hesperid character is the ventral widening of the joints of the club, giving it the well-known hook of that family. The joints are cylindrical without raised lines or grooves. The scaling is very extended, covering the whole dorsum except, in rare instances, the last joint, the ventral surface is also scaled, except a greater or less portion of the club. There are no setiferous punctures, the bristles appear to be typically on the non-scaled area, a transverse row of seven, usually apical, but may be reduced even to two lateral ones. II. *Lycaenidae*: The joints of the stalk are always cylindrical and usually of the club also, like the Hesperids without lines or grooves. The scaling is extensive, both dorsally and ventrally. There is an unscaled dorsal portion at apex of club, a larger portion ventrally which may extend down the stalk even to the base, and may on the stalk be interrupted by scales crossing the margins of proximal segments. The unscaled area is covered with hairs, but there are no punctures. The bristles are arranged much as in Hesperids, but tending to greater irregularity, especially on the stalk. III. *Erycinidae*: The form of the segments is usually cylindrical, always so basally, but may be flattened, or impressed distally. The impression may even amount to a groove, running the length of the joint. The extent of scaling varies, the unscaled area

may be five apical joints dorsally, and seven ventrally (in one form only) the dorsal area shortening to two apical joints, and the ventral area extends *pari passu*, even to the base, often however divided up by transverse bands of scaling. Setiferous punctures cover the dorsal bare area, but hairs maintain themselves over the whole ventral area. The arrangement of bristles on the whole resembles that in the *Lycaenidae*.

IV. *Pieridae*: The antennae clearly divide this into two sub-families, *Pierinae* and *Dismorphiinae* (*sinapis* is our only British representative of the latter). IVa. *Pierinae*: These are characterised (there is only one exception) by having the sense hairs restricted to a longitudinal depression on the ventral aspect of the antenna, the depression may be continuous from one end of the segment to the other, or restricted to a central round or oval patch, the scaling covers the dorsum or all except the last one to four segments, and varies ventrally from absence, to complete scaling, except of the club, often leaving the depressions of stalk as unscaled islets. The bristles are usually one on each side of the middle of the joint, and a ventral pair distad. The antennae of *Pseudopontia* are shown to be undoubtedly Pierid. IVb. *Dismorphiinae*: The last two joints are always united. The not scaled area is restricted to the club, and is rather more extended ventrally than dorsally. The depressions here are a central and two lateral ones, always at the apical end of the segment. The bristles are as in *Pierinae*. V. *Papilionidae*: The antennae differ somewhat in (a) *Papilioninae* (b) *Thaidinae* and (c) *Parnassiinae*. The hairs are always restricted to ventral surface. There is often some lateral compression, making in some species a ventral ridge, with a groove on either side of it, the ridge never forms a carina as in Nymphalids. There is great variation in the manner and extent of the restriction of the hairs, in some *Parnassiinae* they are restricted to a groove or series of depressions, difficult to distinguish from those of *Pieridae*, more usually they suggest a Nymphalid distribution. The scaling is very various in extent also, it may cover the whole dorsal surface except the last joint, or may be nearly wanting; the punctures usually cover any unscaled dorsal area. The bristles are not unlike those of *Hesperiidae*, and *Lycaenidae*, but are more irregular in distribution, and may be nearly evanescent ventrally.

VI. *Nymphalidae*: Though these present great solidarity as against the other families, in antennal, as in many other, characters, Dr. Jordan does not yet determine that he will not finally give family rank to some of the following sub-families which he recognises—*Callinaginatae*, *Pseuderyolinae*, *Libytheinae*, *Acracinae*, *Heliconinae*, *Satyrinae*, *Drasolinae*, *Morphiinae*, *Nymphalinae*, *Neotropinae*, *Danaïnae*. In so immense and dominant a family, a differentiation of groups has often gone further than in smaller and more stagnant families, and so family rank may appear to be deserved by some groups; the temptation to recognise these, however, owing to its convenience in handling large groups, ought to be resisted. On the other hand, if a group be well defined, it is often a verbal, rather than a real, question, whether it is to be called a family or sub-family. The Nymphalid antenna presents two very constant features throughout the whole family that distinguish it at once from any other antennae, and these should go a long way in opposing the sub-division of the group. These are the presence of three raised lines or carinae on the ventral aspect of the antenna, having between them two grooves, to which, or to patches within

which, the sense hairs are restricted ; the other is the distribution of the bristles, two being placed basally close to the median carina, and a lateral pair outside the grooves, almost always median, but sometimes more or less apical or basal. The scaling has a wide range of variation, from a complete dorsal scaling and a scaling encroaching beneath on the grooves, or restricting the groove to patches, as in *L. prorsa*, to a nearly complete absence of scaling in *Danainae*.

Dr. Jordan gives us at considerable length the principles which should underlie the use of these different characters in determining classification. One must agree with all he says under this head. The difficulty lies in the application in any concrete instance. In his analysis there are, indeed, one or two errors of fact that are not really of much importance, such as the statement that in the *Trichoptera* the antennae are furnished all over with a covering of sensory hairs and are taken as representing the not-scaled hairy ancestral type of the antennae of *Lepidoptera*. Such antennae do occur amongst the *Trichoptera*, but also they have well-scaled antennae as in *Oecetis*. He also says that no lepidoptera have wholly scaled antennae. These errors would have been avoided had Dr. Jordan noted in Bodine's paper that both these points are correctly stated, as Bodine refers to the scaled antennae of a Trichopteron, *Mystacides nigra*, and mentions pointedly that the antennae of *Eriocrania (purpurella)* are scaled all over. The result of these mistakes is that a completely scaled antenna is taken to be the highest, instead of, as it really is, the lowest type of antenna ; and that the idea that hairs, even special sensory hairs, are still being constantly evolved into scales throughout the *Lepidoptera* obtains Dr. Jordan's adherence.

In discussing the scaling of antennae, the assumption is made that in tolerably specialised lepidoptera sense hairs in the antennae may be developed into scales, and that, as a matter of fact, when the scaling covers a more extended surface, it does so by the sense hairs on the invaded area undergoing an evolution into scales. This seems to be erroneous, if not absolutely impossible. Scales originally developed from sensory hairs or some similar cutaneous organs, and if so may do so again ; but that they do so frequently and constantly, as must be the case to account for the infinite gradations of scaling in the antennae of butterflies (and elsewhere) is inconceivable. To restrict ourselves to antennae, a typically evolved antenna possesses a series of joints, which are to a great extent homologous with each other, each joint is scaled dorsally, and has sensory appendages ventrally. The scaling is more inveterate as a character on the basal joints, the sensory structures towards the apex, at least in butterflies. So homologous are the joints that they might almost be called interchangeable, and an increase or decrease of their numbers by meristic variation readily occurs. So long as one antennal joint was left in the clavola, one can conceive a complete antenna being regained in the descendants, without the principle of "lost structures never being regained" being transgressed. The same homology of parts, moreover, governs the relations of scaled to unscaled areas. The dorsal scaled area is ready to become wider and wider by encroaching on the sensory area. The sensory area is ready to encroach on the dorsal scaled area according as natural selection may determine. The ids or biophors (or whatever be the proper word) of scales are ready to replace those of sensory hairs at the margin of the

scaled area, those of hairs to replace those of scales along the margin of the sensory area, if circumstances so determine. But ids or biophors of sensory hairs do not become converted gradually or *per saltum* into those of scales or *vice versa*. The scales have more potency basally, the hairs apically, but there is the capacity for each to completely supplant the other if natural selection so decide. The capacity for further evolution of sensory hairs is displayed in the different forms they assume, of which the sensory pit, "batonnet antennaire" of M. le Professor J. Chatin,* appears to be the highest and most recently evolved example; but of these I do not suppose that such evolution proceeds over and over again independently in the way that Dr. Jordan supposes they develop into scales, but that being evolved they have great power of displacing each other if advantage accrues therefrom.

When we examine a Danaid antenna with hairs and punctures over the greater part of the circumference, and with a dorsal area, forming a band along the back of the antenna, without hairs or scales, there is no doubt that the sensory surfaces invaded the scale surfaces, and that the scales disappeared from the remainder of the surfaces. Certainly when the scales disappeared from the dorsal area, they did not at the same time degenerate (or develop?) laterally into sensory organs, but were supplanted by them. There can be no doubt, since the Danaids are one of the highest butterfly families that they had as ancestors forms with good wide dorsal development of scales.

The practical effect of this view as compared with Dr. Jordan's is, to deprive the *Hesperiidae* of the highest place, to allow that the dorsal sensory area of most butterflies, and especially of *Lycaenidae*, is compatible with descent from a form with dorsal scaling to the tip, and to leave the Danaids near the top, while Dr. Jordan's view of the narrow dorsal area only, being the only scaled portion in their ancestors, would place them low down, though he does not say so. It also leaves it very possible for the *Hesperiidae* to be near the root of the butterfly stirps, in ordinary, if not very correct expression, for the butterflies to be derived from the Hesperids.

* "Structure et développement des Batonnets Antennaires chez la Vanesse Paon-de-Jour," par Joannes Chatin, 20 pp. and 2 pl., Paris, 1883.

Migration and Dispersal of Insects: Orthoptera.

By J. W. TUTT, F.E.S.

(Continued from p. 67.)

We have before stated that the migratory locusts of the Old World, with the exception of *Schistocerca peregrina*, belong to the *Oedipodidae*. *Schistocerca peregrina* belongs to the *Acridiidae*, and, with the exception of this insect, all the other species of the genus *Schistocerca* are confined to America. In South America certain species of this genus are migratory, one *S. paranense* is considered by many to be specifically identical with *S. peregrina*. In North America a large locust belonging to this genus, *S. americana*, is also migratory, but *Melanoplus* (*Caloptenus*) *spretus* is, undoubtedly, the chief migratory species of the great northern continent.

In North America the Rocky Mountain Locust (*M. spretus*) appears

to have permanent breeding-places, from which it flies out in some seasons and swarms over the cultivated districts south and east. This is the true migratory locust of North America, and probably causes more real injury than all the other species put together. So marked is the migratory instinct in this species that swarms, hatching in the basin of the Saskatchewan, have been traced to the Gulf of Mexico in the course of one season.

In 1878 the United States Entomological Commission published a *Report* extending to 477 pp. (to which were added appendices extending to 279 pp.) on the migrations of, damage caused by, and the best methods of preventing the injuries, &c., caused by, this species. According to this *Report* the flights taken by locusts in North America may extend from one to two thousand miles, *i.e.*, from their native breeding-places in Montana, to Kansas, Missouri, and Texas. As a rule, the flight is only undertaken during a part of the day and in clear, fair weather, so that the want of food, cloudy or rainy weather, and adverse winds may prevent them from rising and taking wing. The rate at which they fly is variously estimated from 3-15 miles an hour—determined by the velocity of the wind—and it is stated that insects which leave Montana in July may not reach Missouri until late August or early September. The *Report* speaks of these as “invading swarms,” since they leave the permanent area of distribution to travel south or south-east. It also mentions “return swarms,” which, having hatched in the invaded districts, become adult there and then move northward or north-westward in April and May. It should be noticed that the southern flight takes place in July, as in Algeria, and the northern flight in the spring.

The height at which migrating swarms move is probably very variable and certainly difficult to estimate, the want of definition and compactness about a moving swarm making the calculation practically impossible. Locusts were observed at Bismarck above the cumulus clouds. The upper portions of passing swarms have been brought into view by a field-glass when invisible to the naked eye. Byers states that in 1868, in August, he saw a flight when in the Snowy Range, reaching apparently to the highest limit of vision when on the highest peaks, whilst Putnam on Parry's Peak (13,338ft.) states that in 1872 a swarm could be seen filling the air like snowflakes to a great height above the extreme summit of the peak. There is evidence, therefore, that locusts can fly at a height of 13,000ft.-15,000ft. That wind has considerable effect on the direction of flight was well shown by observations on two swarms, an upper and lower, going in different directions at the same time. It has also been observed that a sudden change of wind will often bring a flying swarm to the ground, whilst a sudden lowering of the temperature will most certainly do so. With regard to this, Byers says that “towards noon, on bright, warm days, the locusts rise by circular flights, each seeming to act individually, to a considerable height, and then all sail away with tolerable regularity in one general direction. If there be no wind many of them continue whirling about in the air like bees swarming, but away beyond myriads can be seen moving across the sun towards the south-west, looking like snowflakes. If there be a change in the atmospheric conditions, such as the approach of a thunderstorm or gale of wind, they come down precipitately, seeming to fold their wings and fall by the force

of gravity, thousands being killed by the fall if it be on stone or other hard surface. If not interrupted by such causes they descend during the afternoon."

We have already referred to an irruption by night (*ante*, p. 65). Newell reports that, in Iowa, a straw stack burning by night attracted the locusts, and in the morning bushels of dead ones were found in and around it. Aughey relates that whilst travelling at night on the banks of the Bow River, in August, 1866, a sudden change of wind about midnight brought down "hosts of falling locusts," and that in the morning they were found thick where none had been seen the night before. A similar fall is reported as having occurred at 11 p.m. in Nebraska, whilst many other observers report swarms as observed flying late in the evening. It is said that the young locusts that hatch in the invaded region display gregarious instincts from the commencement of their existence, congregate in immense numbers in warm and sunny places, and during damp weather they seek the driest possible positions. When migrating they move, as a rule, during the warmer hours of the day, only feeding if hungry by the way, but generally marching in a given direction until towards evening. They travel in groups, in no particular direction, but purely in search of food, although there is a general tendency for those hatching in the northern states to go south, whilst those of the southern states generally tend to go north. In 1875, near Lone, in Kansas, the young locusts crossed the Potawotomic Creek, about 20-25 yards wide, in millions, whilst the Big and Little Blues, two tributaries of the Missouri, one of which is 100 feet wide (the other rather less), were crossed at numerous places by the moving armies which would march down to the water's edge and commence jumping in, one upon another, and so pontoon the stream to effect a crossing. Riley further notes that a great army was observed to fall over a perpendicular ledge of rock 25-30 feet in height, passing over in a sheet apparently 6in.-7in. in thickness, and causing a roaring noise similar to a cataract of water.

Although there was evidence of a tendency for the early-developed spring broods to leave the southern states in a north or north-westerly direction, the actual result showed that those which reached into north-west Dakota, Wyoming, and Montana were few in number, but these return flights are small and unimportant, and are stated to have "very little bearing on the general question except to show that even with a superabundance of food they attempt to leave a country so different from their native haunts, unfitted for their continued development, in which they are infested by parasites and decimated by disease in the course of a single generation." The information relating to these "return" swarms is possibly the least satisfactory contained in the *Report*, and rests on so many probabilities that one hesitates to accept a single generalisation. This is unfortunate, because it is this very point, in which a migrating instinct is shown, that is most interesting, and on which the most exact and careful observations must be made before generalisations can be indulged in.

Supplementary reports were afterwards published, and in 1883 an interesting report of the movements of *M. spretus* in Montana in 1880 and in Wyoming, Montana, &c., in 1881, was included in the *Third Report of the United States Commission* appointed to enquire into the depredations of this and other insects. In this *Report*, p. 24, Bruner

fixes the "permanent" home of this species as the district between 108° and 117° W. long. and 40° - 53° N. lat., and describes it as being considerably elevated above the surrounding country, treeless over the greater portion, and also arid, thus agreeing to some extent with the locust-inhabited areas of Eastern Europe, Northern Africa, Western and Southern Asia, Central Australia, and portions of Central and South America. He considers that the species is thoroughly migratory by nature, and asserts that, even in years when no distant migrations are carried out, some of the insects may be seen on the move in July, August, and September, whilst the progeny of a single female will move from the locality where it hatched to some other point in this native habitat or adjacent to it. This same observer points out that, although this insect at times visits and breeds throughout the greater portion of the country lying west of the Mississippi river and east of the Cascade range of mountains, it is most partial to the region bounded—(1) on the east, by a line beginning on the south, at the junction of the parallel 37° N. lat. with the meridian 106° W. long., and running in a north-easterly direction to the point where the parallel 45° N. lat. cuts the meridian 99° W. long., whence the course changes to the north until the boundary line is reached, where it inclines to the north-west in a curve and strikes parallel 53° N. lat. at the meridian 108° W. long. The northern boundary is the commencement of the trans-continental timber region of British America. On the west this region is bounded by a line nearly coincident with the meridian 107° W. long., sometimes running to the east and at other times to the west of it, and towards the south making an abrupt angle to the south-east to avoid the desert regions of southern Nevada and a portion of south-western Utah. All the country comprised in the above district is at times overrun by swarms of this locust, and possesses such climatic and other conditions as are best adapted to its life and great increase. Much further information as to the character and extent of, and general influences affecting the migrations of this species is comprised in this *Report*, pp. 22-52.

In the same publication (pp. 61-64) Bruner points out that *Anabrus simplex*, a large wingless, dark-coloured Decticiid, known as the Western Cricket, appears to have a distribution coincident with that of *Melanoplus spretus*, that it sometimes migrates in vast swarms, marching in droves or herds, as a rule, collected into lines, varying from a few to hundreds of yards in width, and from a few hundred feet to a mile or more in length. Normally it is confined to the more elevated wastes and mountain valleys, from which, in abnormal seasons, the swarms migrate into Oregon, Nevada, Utah, Washington, Idaho and Montana. In *Insect Life*, viii., p. 47, there is a further note on the migration of *Anabrus simplex*, which is stated to have been so abundant in 1895, on the Bear River, at the boundary of Utah and Idaho, that they formed an army ten miles in length and a quarter of a mile wide, devouring everything green in their path. The observer says that, "in front of this army the landscape was green, behind it a brown waste. Large streams deflected their course, but small creeks they crossed with impunity, jumping in and swimming. They climbed the willows that grew over the brook, and by their combined weight bent them over, thus bridging the stream. After the crickets crossed, the willows appeared as if scorched by fire. These streams were filled with

trout, and, as the vanguard of the army plunged into the water, they were pounced upon by the hungry fish, but when the tens of thousands followed, so as to almost dam the current, the gorged trout sought the deepest pools, feeling, no doubt, like the Hebrews after their feast of quails."

The Lepidoptera of Mucking.

By Rev C. R. N. BURROWS.

Mucking.—Ah! No, do not blush fair reader, this is not a naughty word, it is the name of a place—of my present home. From Rainham, of pleasant name but sad odour, I have migrated to Mucking, a queer name indeed—but a place which ought to have the purest air to be breathed in England. For Mucking lies on the Essex side of the Thames at the very first bend of the river, and our outlook is down the mouth of Father Thames, and out into the open sea. Such is fate, perhaps retribution, for having abused Rainham—to have to write Mucking at the head of every letter, and whisper my new address to anxious enquirers. I must confess that at first I resolved to change it to Claremont, but when I found there was an attempt on hand to make it Linford (*recte* Lymford, from Limus=slime, mud), I reconciled myself to the old name, which means simply "much grass," or "extensive pasture" in the Anglo-Saxon.

To describe the place is not easy. It is marsh and low hill, just not under water, nor quite above, and when there is a high tide—not to say a flood—extensive tracts of the marsh-land disappear until the water can run away. This is as it should be, from a resident entomologist's point of view, as it makes the danger of insect poachers on one's preserves, so much less. Fancy a reader of this paper hurrying to catch the last train, and finding something under a quarter of a mile of running water over the path he came—and the memory of the deep muddy ditches on either side now hidden from his sight. I am not of a grudging disposition, so will only remark that I know a short cut to the station which is never flooded at all. I have said that Mucking is neither entirely marsh nor hill. Neither is it all grass, nor all trees. But it is an agreeable mixture of the two; just what a country place should be, for one who likes woodland species, but loves the "wainscotes;" and after living six years quite in the marshes at Rainham, one must acknowledge some satisfaction at once again finding at least some of the woodland insects one has missed so long.

Of course the first season in a new locality is never very productive. It partakes more of the nature of tasting tea—or sampling the wine vaults. One "wants to know," and one generally, I find, misses a good many of the best insects in finding common species. One does not know where to begin; so I find my entomological diary for 1898, a very unsatisfactory one indeed. My first entries read: March 24th—"Thunder, hail, gale." March 25th—"Snow and north wind," which do not promise well. Then comes March 31st—"Anisopteryx aescularia in the duck pond." April 3rd—"Taenioctenipennis munda, in the school." April 8th—"Xylocampa lithoriza, in the garden," and these entries show that so far, I had done or attempted no collecting, whilst "larvæ of *Arctia villica*"—and "*Cyaniris argyolus* flying in the garden," seem to close my first feeble efforts to begin, and I do not seem to have commenced

in earnest until July 16th, when sugaring was taken in hand. Thereafter the latter method was kept up more or less regularly until the end of August, then dropped, and begun again, for reasons which will appear later, on the 21st of September, and finally dropped for good at the end of October. I only took my net out of the garden once during the whole season. I will not note the commonest insects which occur everywhere, but pass on to those which to me appear more worthy of mention.

First, then, as to butterflies: *Colias edusa* turned up on August 27th, when two specimens were brought in to me, I did not go after them; *Cyaniris argioides* was fairly common in both broods; *Thymelicus lineola* occurred on the hill-sides. Of Sphingids I noted—*Choerocampa elpenor*, *Macroglossa stellatarum*, and *Trochilium crabroniforme*, the larvæ of the latter common in willow stems. Among the Nycteoids only *Hylophila bicolorana* occurred; of the Nolids, *Nola cucullatella*; of the Arctiids, *Nudaria senex*, *N. mundana*, *Calligenia miniata*, and *Lithosia lurideola* came to light; of the Hepialids, *Hepialus sylvanus* was fairly common, and our only Cossid, *Cossus ligniperda* came to sugar. Of the Cerurids, *Cerura vinula* obligingly laid a batch of eggs for me upon a dwarf poplar, and two empty cocoons of *Cerura bifida* proved that this, to me, scarce insect is in the neighbourhood. Of the Notodonts I found only *Lophopteryx camelina*, but no doubt many others would reward a more diligent search.

Now for the Noctuids. *Leucania conigera* swarmed both at light and at sugar. I mention this because it has always been to me a most difficult insect to obtain; *Leucania straminea* appears to be fairly common, but so far I have seen no *L. obsoleta*; *Calamia phragmitidis* and, of course, *C. lutosus*, end up my "wainscot" captures. *Hydroecia nictitans* occurred, but was entirely outnumbered by what I take to be *H. paludis*, quite unlike *H. nictitans* to my mind, and I cannot imagine anyone being so dense as to ignore so fine a species; but I daresay I might have passed them over had it not been that I indulge in earnest study of "*The British Noctuae and their Varieties*"—which I use as a digestive at meal times, being a bachelor—and have digested with such a happy result, as to be always keenly on the look out for all the forms there described, but, above all, for forms which the author had not then got hold of. Yes, the book does make me hungry—for varieties if not for bread and butter. *Dipterygia scabriuscula*—not very many visited the sugar. *Luperina cespitis* in its season, and plenty of *Cerigo matura* both at sugar and at light. Of *Mamestra abjecta* I took more than I have ever found before, all more or less of the shiny-suffused form; *M. sordida*, not common; *Apamea ophiogramma* is in my garden again, but I carefully abstained from taking either larvæ—which I found—or imagines, which I did not even see. I was delighted to find *Agrotis corticea* again, an insect which I had not come across since Brentwood days, and supposed to be more or less inclined to frequent wooded districts, although I know it occurs abundantly enough at some coast localities such as the Deal sandhills. *Agrotis tritici* appears to incline towards the *agulina* form as at Rainham, and was fairly common. Of *Agrotis obscura* I found several in very fine condition, I shall hope to find it again. *Noctua stigmatica* appeared to be pretty common, but, so far as I could see, always in bad condition. Having some beech trees in my garden, I was not surprised to come

across several *Tiliacea aurago*, and a row of limes produced *Tiliacea citrago*, whilst the elms gave me *Mellinia gilvago*, but both the latter species occurred somewhat sparingly. One afternoon a visitor spotted a wing of *Tethea subtusa* in the room which, in my spacious vicarage, I devote to service as a "moth trap," which raises hopes of more. *Hecatera serena* proved to be common, sitting on trees, at sugar and light. On September 21st, having tired of collecting in my garden for some weeks, I thought I would sample the insects outside, and to my surprise took three specimens of *Epunda lutulenta*. Now this insect had never come my way before, and of course I was very pleased. A chorus of correspondents cheered me with the news that they, too, had never seen *E. lutulenta* alive, so I caught all which would be caught. The last specimen was taken on October 6th, and made the grand total 129. These specimens proved most interesting to me, and require careful examination. It will be sufficient to remark here that they seem to supply variations of the type form (reddish) parallel with those recorded in the black form in *Brit. Noctuae and their Vars.*, vol. iii., pp. 53-59. I got a few batches of eggs which, distributed to friends, will, I hope, result in satisfactory specimens. *Miselia oxyacanthae* ab. *capucina* outnumbered the type, but I am most struck with the yellow aberrations of this insect, which are most interesting and will also call for further description. *Aplecta nebulosa* and *A. advena* turned up, the former quite a stranger to me, unseen since I left Brentwood, the latter usual on the marshes and a very large race. *Hadena genistae* rather surprised me, sitting one morning upon a dahlia post. I had not seen it since I left the wood country. *Catocala nupta* as usual proved to be in countless numbers.

Of the Geometrids—*Ennomos fuscantaria* favoured me in solitary state—in the moth trap; *Zonosoma pendularia*, also one worn specimen; *Acidalia trigeminata* proved to be one of the insects of my garden. I should have passed it over had not a friend brought out his net, and taken about half-a-dozen, whereupon I tried also, and took a good many more; *A. marginipunctata*, a single specimen. Passing over common things, I note, with some surprise, *Strenia clathrata*, not common on the marshes, and *Ematurga atomaria*. *Aspilates citraria* also gave me some surprise; it was found flying with *Colias edusa*, two female specimens being brought to me from the same field in which the latter were taken. Of the "Pugs," I have so far detected only *Eupithecia oblongata*, *E. subfulvata*, *E. subnotata*, and *E. rectangulata*. *Anticlea rubridata* again turned up, not quite a surprise, but very welcome to me; while I must confess that it was a surprise to find *Scotosia rhamnata* at light, for I have not yet found a plant of the food.

Of the Pyralids I have noted both *Aglossa pinguinalis* and *A. cypralis*, *Asopia costalis*, *A. glaucinalis*, and *Pyralis farinalis*, the latter not met with for years, *Scoparia cembrae*, *Nomophila noctuella*, *Endotricha flammealis*, *Scopula ferrugalis*, *Spilodes verticalis*, and, of course, *Pionaea forficalis*.

Whether or no I shall do better this coming season or not remains to be proved. I offer these notes in the hope that they may be of interest as a record of the species to be found in a little-known and, so far as I know, unworked locality—which, although close to the "highway of the nations," is about as out-of-the-way a place as I ever chanced to live in.

Entomological Notes from the Riviera.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Following up my notes, *ante*. pp. 78-80, I may add that on February 24th *Pieris napi* and *Chrysophanus phlaeas* were met with for the first time. I also found an ant-lion larva on the sands at La Bocca, a most curious-looking creature, very like a *Chrysopa* larva, but with arched back, and legs curiously stretched out laterally like a *Notonecta*, only it is the first and second pairs that are so disposed, and not the third, which are short beneath the abdomen, directed backwards, and terminate in a strong hook. Its most remarkable feature is the rapidity with which it buries itself, by a backward movement, in the sand, about a second being the time occupied.

The flowers are progressing rapidly, the *Narcissus tazetta* is nearly fully out, *Ranunculus ficaria* is in full bloom, and the alder, elm, ash, and some poplars are flowering freely, but without trace of leaves; the buds are hardly swelling yet on any deciduous trees. Since our arrival, and probably for some time before, the wild rosemary and a large flowered, cultivated species, have been in magnificent bloom, and a large plant of the latter, with half a dozen *Xylocopa violacea* flying round it, as well as a number of *Bombus* and *Apis* species and a few *Andrenas*, makes a scene of insect life, to which the dark wings of the large bee give a sub-tropical aspect that we do not meet with in England, even in summer. Next day, February 25th, everything was changed. English March was in full force—a strong east wind, a leaden sky with a good deal of rain, and a fall of temperature, made a combination only to be met by a good deal of courage and a great coat. Insects were, of course, quite invisible. I suppose this was about the worst day of the season. Every one agrees there has been no winter, and M. Brabant tells me he took *Colias edusa* and *Argynnis lathonia* on January 24th. On the following morning, February 26th, the hills behind Grasse were snow-covered down to nearly 1500 feet, though the line rose gradually after the sun got out, there being a very clear atmosphere and brilliant sun, but with a nip in the air that made one *Pyrameis atalanta* and one *Pieris rapae* the only butterflies seen in the course of a walk. Even *Macroglossa stellatarum* was not on the wing, although, usually, it has been very abundant, studying walls, banks, and rocks, in its well-known manner, and sucking nectar from the rosemary and other flowers; its condition is various, usually somewhat worn. It has no doubt been on the wing on suitable occasions all the winter, like *P. atalanta* or *P. cardui*.

The conditions of flight for *M. stellatarum* appear to be simply an adequate temperature, either of the air, in which case it will fly in dull weather or by night, or of direct solar radiation, when it flies at Cannes at any time during the winter when there is hot sunshine. It settles frequently on rocks and stones, generally in shallow hollows, where it is very inconspicuous, and as it remains in these should the sun become obscured, it is probable that it hibernates, so far as it does hibernate, in such situations. I am still at a loss to understand why it so carefully examines walls and banks. It cannot be employing so much time in finding suitable resting-places, nor have I met with any facts to suggest that these are males looking for females at rest. It cannot be mimicking *Anthophorae* or other similar bees, for the resemblance is

not close, and why should it affect walls, where, on this hypothesis, it has no other business, in order to do so? I have seen *Eristalis tenax* enter a room and examine the wall in the manner of *M. stellatarum*, being specially attracted by certain darker points of the paper, but it did not appear to be mimicking any bee, but rather misled by the paper into supposing it had found some usual pabulum. On February 21st, at Ranguin, I found a dipteran that was certainly mimicking some *Andrena* or *Osmia*, flying along an old wall with precisely the manner, appearance, and hum of a bee, and only seen to be a dipteran when it settled to sun itself instead of entering a crack or hole in the wall. All which, however, brings us no nearer to understanding the vagaries of *M. stellatarum*.

In looking, even casually, over Millièr's *List of the Lepidoptera of the Alpes Maritimes*, one cannot help being struck by the great changes that have occurred in the 20 years that have since elapsed in the aspect of what is now Cannes. Not a few of his species are recorded from places that are now built on, enclosed, or otherwise have hardly any of their original natural features left. The same impression results from consulting Ardoino's "*Flora*" of the district, now 20 years old, and quoting older authorities. The Croisette is not infrequently mentioned as a station of sundry very local species, it is very improbable that even a fraction of these remain, many of the commonest native plants being practically exterminated and the whole ground enclosed and overrun. On February 26th I saw a long-tailed Chalcid carefully examining an egg mass of *Mantis*; I failed to capture it, but the insect may probably be bred from some of these curious ovipositories. These egg-masses are sometimes exposed on twigs and grass stems very conspicuously, and must get well baked in the sun, and it was on one of these I saw the *Chalcis*: more usually, however, the egg-masses are half hidden under the shaded side of a rock or stone. On the 28th, visiting for the first time a haunt of *Polygonia egea*, near Mouans-Sartoux, three specimens were seen.

On March 2nd I saw two males and one female of *Gonepteryx cleopatra* in the Esterels, also *Eugonia polychloros*, *Saturnia pavonia-minor*, *Eupithecia pumilata*, and *Pachynemius hippocastanaria*. Full-grown larvæ of *Charaxes jasius* were also observed, and *Pararge megera* was flying freely. I saw no *Thais*, and no *Micropteryx*, but *Tortrix unicolorana* was in pupa. On the 3rd I went via Mouans Sartoux to the Auribeau Valley and saw *Callophrys rubi* abundant, *Anthocharis belia*, one, and *Euchloë euphenoides*, one. I also observed a small *Epichnopteryx*, apparently *palla*. On the 4th a *Lithocolletis* emerged from *Cytisus triflorus*—*L. triflorella*. On the 5th a small *A. taylori* was taken at St. Cassien. On the 6th there was a cold east wind, nothing was on the wing, but I found a pupa of *Spilothyrus altheae*, and a fullgrown larva of *Pyrameis atalanta* whilst I heard of a specimen of *G. cleopatra* having been seen in Cannes, about a fortnight previously, probably on that very warm February 20th. On March 7th there was a violent and very cold easterly gale and no sun, a day as unpleasant as England can show in March, except when it adds snow or sleet. One *P. atalanta* and one *Pieris rapae* were seen in a shady corner. On the 6th some *Solenobia* cases were taken on elm-trunks near Pegomas. One example had made a very gay case, with two bands of yellow lichen. They appear to be rather more than half grown *conspurcatella*, or they might be *Diplodoma melanella*.

Collecting in the Chilterns.

By H. ROWLAND BROWN, M.A., F.E.S.

A favourite expedition of mine at all times of the year is from Tring or Wendover by the upper road to Kimble, then straight to within two miles of Prince's Risboro', and sharp to the left across the Chilterns by the road which eventually leads to Gt. Missenden. On a bicycle the journey is easy enough. Walkers coming from London should take the Metropolitan to Wendover, and follow the route indicated, and I can promise them a rare treat from every point of view, including the entomological. For some reason or other the insect fauna of Buckinghamshire does not seem to have received its fair share of attention of late years; a fact due perhaps to the difficulties of railway access, and the large number of enclosed estates throughout the county. I do not know of any modern complete list of the lepidoptera to be found within the area, although there are many notices in Newman's *British Butterflies*, supplied by the Revs. Joseph Greene and Harpur Crewe, of a remoter date. So little, however, has the character of the county changed, and so comparatively indulgent has been the builder, that I should not be surprised that, of the 46 butterflies catalogued when the first edition of *British Butterflies* was published, the majority remain in their old haunts, save, of course, such things as *Lycaena arion*. The leafy coppices of the great sporting estates look the very places for the dainty *L. sibylla*, and unless *A. iris* is collected to death, it is hardly one of those insects which die out in an unaccountable manner like *Aporia crataegi* or *Thecla pruni*.

Halton, Drayton-Beauchamp, and Aston-Clinton—the double-barrelled name is of frequent occurrence throughout the county—lie between Tring and Wendover, and in the magazines there are scattered notices of a few other Buckinghamshire localities. Unfortunately I have never been able to go over the ground after the first week in July until September, so that there is necessarily a lapse in my observations during the most important season of the entomological year, but from what I have seen I have every confidence that the missing links may still be supplied. Bicycle trips with head-quarters some 30 miles away are not altogether satisfactory, as it is impossible to do more than give attention to the day fliers. The inn at Little Kimble, however, affords excellent quarters, and I was interested to find a French gentleman and his family unexpectedly established there last June when I passed through, so that it is clear that the beauty of the county and the charm of the chalk downs have achieved something greater than a local reputation. There a bug-hunter might stay a week and comfortably work the ground to the profit of his health, the enlargement of his series, and the pleasant certainty of adding a delightful page or two to that picture-book of memories which is no less valuable to the lover of Nature than specimens obtained and series completed. Chalk downs have an irresistible fascination, whether by the sea, or stretching inland as they do here from the Thames Valley to Cambridgeshire. With a peculiar flora follows an interesting fauna, and when the hills are well wooded into the bargain, the chance of things new to the collector as well as to the county lists is enhanced. But whether the wheel or the slower locomotion of nature carries us over the ground, in winter or spring, in summer or autumn, there is

always much to be seen and enjoyed on these delightful and breezy uplands. I have spotted here the first *Aglais urticae* of the year fanning his wings on some bright March morning when the wind sweeps the last leaves from the lower beech trees, and only in the hollow of the road or some disused chalk-pit is it possible to escape the boisterous nor'-easter. On such a day the sky above our heads seems suddenly lifted; the atmosphere is clear as glass, and it requires little imagination to hear the voice of spring sounding cheerily across the great vale of Aylesbury at our feet, where the young lambs are bleating and the vivid green of the new wheat intersects the browner patches of pasture land, that appear from our higher elevation like the regular chequers of the chess-board. Cross to the southern slopes a little later, and in the deep lane which divides the budding coppices, you will not have to wait long before *Gonopteryx rhamni*, like a winged primrose flashes out among the tender saplings, chasing the April *Pieris*—"Where she launches on her virgin flight, A pearl among the emerald of the trees." The woods are full, indeed, of "Brimstones," but I have, here at any rate, found the females largely in excess of the males. In the same locality, and everywhere on the sunny sides, *Euchloë cardamines* and the larger *P. brassicae* flit restlessly to and fro, though hitherto I have not come across *Leucophasia sinapis*†. In early seasons April is hardly over before *Polyommatus icarus*, *Syrictus malvae*, and *Thanaos tages*, with *Chrysophanus phlaeas* and a belated *Pyrameis atalanta* or two come to swell the list, while in May, on the extreme summit of the pass, to the left, among the scrub and beech woods, *Callophrys rubi* literally swarms, and *Coenonympha pamphilus*, with the first brood of *P. astrarche*, is equally abundant. Come again in mid June. The woods are now in all the full beauty of their first tender foliage; the grass is deep upon the lower slopes, and at every step the air is sweet with the fragrance of the sweet-scented orchis, which, with its congener the bee-orchis, occurs everywhere in profusion, among the patches of golden cistus, and purple-red burnet. *C. rubi* is now going over, but the hillside is alive with *Cupido minima*, Pierids innumerable, and, among the Heterocera, *Adscita statices*, *Nemeophila plantaginis*, and other day-fliers. A cloud passes over the sun, and we lie down upon the velvet terrace, noting that upon many a stalk *Anthrocera filipendulae* has already woven its pearly cocoon, while a few "early birds" boom lazily among the milk-worts and flaming hawk-weed. *Epinephle ianira*, too, springs up as the sun streams out again, and we have barely time to enjoy the splendid prospect of the popped corn-fields at our feet, before the net is again requisitioned for the first immaculate specimen of *Enodia hyperanthus*. *Pamphila sylvanus*, and perhaps *Thymelicus thaumas* as well, may greet the sight of the collector, and, no doubt, a later expedition in the first days of August, will yield an even better bag, for when I bade good-bye to the chalk-hills on the third of September last year, I had seen enough to convince me of the fact. The downs then were all burnt up; the corn fields gathered into golden sheaves, and the foliage of that deeper tint which memory associates with the plenitude of summer. A mile or so back on the Wendover road I caught a glimpse of *Colias edusa*, the sole

† There is a locality for *L. sinapis* and *C. palaemon (paniscus)* in the extreme north-west corner of the county (Cf. *Ent. Rec.*, vol. ii., p. 233).

British representative to gladden my eyes last year. The second brood of *P. astrarche* was still fresh, and *P. corydon* was also much in evidence with the autumn editions of *G. rhammi*, *P. atalanta*, and *V. io*; but what interested me most was the capture of two very worn specimens of *Argynnis adippe* and *P. comma*, too shabby for the cabinet, but still welcome, as indicating the existence of the respective species in my happy hunting ground. *M. galathea* flies in August over the downs from Tring to Risboro', nor must I forget to mention *P. cardui*, apparently rare enough last year, but not uncommon at the scabious flowers, beloved of the last brood of *A. urticae* and the ubiquitous "Whites."

That there is nothing of any particular value from the dealer's point of view, in the list I have compiled, I am well aware, but, as I said before, I have only paid flying visits to the Chilterns, and can, therefore, give but a very incomplete idea of what may occur there, as well as the species actually noted. I venture to hope, however, that the short account I have offered will induce metropolitan collectors, who love good sport and beautiful scenery, to try a change of venue, and local entomologists, if any there be, to note any additions they can to the butterflies enumerated. The Heterocera, moreover, in such a district should be equally interesting, and I can only regret that I have not yet found an opportunity for working the woods by night, or watching the sunset of a summer day from the breezy heights sacred to the memory of Cymbeline and, in later days, of the Roundheads and Cavaliers, who fought with and against John Hampden of Chinnor, at Chalgrove Field, away to the westward.

The Collecting Impedimenta of a Lepidopterist for a trip abroad.

By J. W. TUTT, F.E.S.

In my capacity as Editor of this Magazine, I have been approached a great many times as to the impedimenta required by a lepidopterist who is about to collect in Switzerland, Italy, France, &c. Of course this impedimenta depends largely upon the temperament of the collector, his habits, requirements, &c. If he is going to paper his captures, then his requisites are small; if, however, like myself, he is going to set his captures the matter is more complex.

My outfit consists essentially of the following:—Nets.—Two or three Graf-Krüsi's (I would not be without these on any account), and one large jointed net. These practically occupy no space in my Gladstone bag. KILLING APPARATUS.—A strong shallow biscuit tin about one foot square, but only about three inches deep. In this I pack a large stoppered bottle of strong liquid ammonia, with the stopper carefully enclosed in a large leather cap, a smaller bottle of chloroform and a paint brush. These two bottles are carefully wrapped in cotton wool and the box packed tightly with nested glass-bottomed boxes and cotton wool, so that no empty space exists between the bottles and lid of the box. The tin box serves for a killing-tin whenever needed. I generally roll all the available underclothing I take with me round this and put it (so that the tops of the bottles are towards the handle) in my Gladstone. ZINC BOXES AND PINS.—Two zinc boxes are generally filled with quarter ounce boxes of pins—Noctua size (9's, I think, they used to be 8's), and 10's—a few 19's or 20's for very small fry, and a

few longer ones for an odd Bombycid or Sphingid. A small mustard or cocoa tin quite full of "doll's pins," a "spanner," and a sheet of "tracing paper" complete this part of the apparatus. These are placed with the remainder of the nested glass-bottomed boxes in a large satchel. **SETTING-CASE.**—My setting-case is rather primitive—opens like an ordinary store-box, is just long enough to take the setting-boards sold by Doncaster and Crockett, the setting-boards have about a quarter of an inch of the cork taken off at each end. Inside one end of the box a slip of wood is fixed, leaving just space enough under it to slip one of the cut ends of the boards, at the opposite end is a similar slip (working on a nail almost driven home) which goes down on the other cut ends and is then fastened by a flat brass catch fixed in the edge of box and turning over the slip that falls on the ends of the boards. The other side is similar, but the two pieces that hold the setting-boards in position are fixed down half an inch below the edge of the box, so that a corked piece of wood exactly the size of the box (inside) falls on them. This is held in place by two little hooks, and is used for set insects if wanted. The ends of the box have a piece of perforated zinc let in them. I bought this at one of the dealers' shops about 15 years ago, and have no doubt similar (and probably better) ones can now be obtained. **STORE-BOXES.**—For packing I have double-boxes, that is, two store-boxes as it were placed back to back, by which one of the thicknesses of the wood is done away with centrally. Topp, of Reading, made my last ones. Doncaster and Crockett, I believe, also make them. If this and the setting-case are made of the same size their carriage is easy—one strap does for both. One of these boxes should be enough for a month's captures if one is going on a holiday tour and wants to see places as well as catch insects. I never let this box nor my setting-case into anyone's keeping after the insects begin to be packed. **SETTING-BOARDS.**—I generally pack a few spare ones flat on my clothes, one each side of the Gladstone, just before closing it, they will travel equally well in the store-box whilst the latter is empty. **SMALL TIN BOXES.**—About two dozen 1" diameter and $1\frac{1}{4}$ " high to post home with larvæ, eggs, living ♀s, &c. **LENS.**—A good lens and the two-thirds belonging to my microscope. **NOTE-BOOK.**—A small note-book and pencil. **FORCEPS** must be used for close packing.

The important point in travelling abroad is, if possible, to have no more luggage than you can carry yourself at a pinch. There are times when the methods of porters and facteurs are intolerable, and then one must be able to pick up his baggage and walk. I never like to have more than three packages—my satchel, which I can sling over my shoulder, my setting-case and store-box strapped together, and, lastly, my Gladstone. If a porter doesn't move quickly enough, then, to please me, I say polite things to him, and carry my things myself. Until I actually went abroad to collect I had an impression that the trouble and expense were overwhelming. The first cost (for railway fare) is, of course, necessarily a rather large outlay, though one can go to Switzerland and back as cheaply as to outlying parts of the British Islands. The average hotel expenses vary from $5\frac{1}{2}$ francs to 7 francs (4s. 6d.—6s.) once you are there, and if you are inclined to settle down for a few days in the same place and live *en pension*. Once having paid your fare, you can, if you do things for yourself, manage excellently on an outlay of 40s. to 45s. per week per person. I am not prepared,

being much too busy, to discuss details individually with intending tourists, although if any one cares to formulate definite questions on a reply post-card, I will do my best with them.

ORTHOPTERA.

On the Abbreviation of Organs of Flight in Orthoptera.

By MALCOLM BURR, F.Z.S., F.E.S.

Podisma is an example of a genus practically losing the power of flight, and the *Ephippigeridae* of a family that has lost this power. Other genera which have totally lost the use of the wings for flight are *Anisolabis*, *Apterygida*, *Chelidura*, in the *Forficularia*; *Aphlebia*, and all the *Perisphaeridae* in the *Blattodea*: all the *Eremiaphilidae* in the *Mantodea*: the *Lonchodidae*, *Bacunculidae*, *Clitumnidae*, *Uladomorphidae*, *Anismorphidae*, and the *Bacillidae* in the *Phasmodea*: *Chrysochraon*, *Glyphanus*, *Nocarodes*, *Ocnorodes*, *Eunapius*, *Platyphyma*, *Omnatolampis*, *Sitalces*, *Mesembria*, and other *Acridiidae*; *Thericles* and the allied genera; *Proscopidae* in the *Acridiodea*: the *Callimenidae*, *Orphania*, *Poecilimon*, *Barbitistes*, *Isophya*, *Odontura*, *Leptophyes*, *Amphiestris*, *Onconotus*, *Analota*, *Pterolepis*, *Rhacocleis*, *Thyrconotus*, *Anthacius*, *Ctenodecticus*, *Anterastes*, *Pachytrachelus*, *Psorodonotus*, *Saga*, *Troglophilus*, *Dolichopoda*, *Anostostoma*, *Hemideina*, and many others in the *Locustodea*: the *Trigonidiidae*, *Gryllodes*, *Myrmecophilidae*, *Mogoplistidae*, in the *Gryllodea*. These names might be increased to an enormous number, but it will be seen from the number ending with a patronymic termination that a very considerable amount of sub-families are incapable of flight.

The loss of the power of flight is always attended with some compensation. In all earwigs the legs are developed for running, and they are all rapid creatures. Cockroaches are but feeble flyers at the best, but they are very nimble on their feet. The *Mantodea*, with at least one remarkable exception, are not active insects. They use their wings little, and can walk but slowly, but their fore-legs are so wonderfully developed that it is to their advantage to sit quietly, to allow the unsuspecting fly to come within range of their formidable front legs. The *Phasmodea* are sluggish creatures, and usually spend their time sitting quite still, or crawling very slowly. By this they do not betray by hasty movement the concealment which they gain by their curious colours and forms. Many of the flightless *Acridiodea* are difficult to find in their haunts, while nearly all possess a remarkable development of the hind legs which enables them to escape their prey by leaping. The *Locustodea*, again, are protected by their colour and their adaptation to their environment, or else by their activity. Many species are very difficult to capture when they hide in thick brambles and shrubs, in which wings would be useless or in the way, but where their powerful hind legs enable them to escape with rapidity. The crickets, which usually live in holes, tunnels, and burrows, have little use for wings to fly, except for migration. Gilbert White records an invasion of *Gryllus domesticus* to a house, which they entered from all quarters, flying with an undulating flight, like that of some of our small birds. The *Oecanthidae* are the only crickets which inhabit flowers and shrubs. They may be often taken sitting on tall flowers and vines, but they

have fairly well developed wings, with extensive elytra, for the double purpose of stridulation and protecting the wings.

Crickets have discovered a new use for the wings. When folded these voluminous organs project well beyond the elytra and beyond the abdomen itself in many species. This is the case with *Gryllus domesticus*. These projecting portions are sensitive, and probably, with the cerci, act as antennæ, and delicate organs of touch for protection in the rear.

The extreme variability of these organs is probably due to panmixia. Weismann notices the same fact with regard to the tails of domestic cats and dogs (Weismann, "On Heredity," English Trans., 2nd Ed., vol. i., p. 442). The existence of these organs is not absolutely necessary for the welfare of the species, therefore natural selection no longer exerts any influence over these parts, and an occasional variation is not eliminated by the early destruction of its possessor, so that the organs are not maintained at such a pitch of development, though it must be remembered that long after the wings are too short to be of use for flight, the elytra of the males are retained for a totally different purpose, namely, stridulation, with the result that the female receives "transferred" rudiments of elytra which are equally useless for flight or stridulation.

(To be continued.)

COLEOPTERA.

COLEOPTERA TAKEN IN CUMBERLAND IN 1898.—The coleoptera noted in this paper are all additions to the list contributed to the *Entomologist's Record*, vol. x., p. 126. Most of the species referred to last year (1897) have again been observed, many of them in abundance. During 1898 we have considerably extended our area of research, without stepping beyond the confines of Cumberland. Where no locality is attached to a species, the immediate neighbourhood of Carlisle is intended. Mr. E. A. Newbery has again very kindly assisted in naming and verifying doubtful species. *Carabus glabratus*, one fine example on Honister Crag. *C. granulatus*, under stones near Carlisle and under shore refuse at Silloth. *C. arrensis*, under stones, Sty Head Pass and Honister Crag. *Notiophilus aquaticus*, under stones, &c. *Nebria gyllenhali*, very common in the Gelt valley. *Elaphrus riparius*, banks of the Eden. *Dyschirius impunctipennis* and *salinus*, sandhills and mudbanks on the Solway Firth. *D. globosus*, common on mudbanks at the estuary of the Eden. *Bradyellus similis*, in moss. *Harpalus tardus*, on pathways. *Stomis puniceus*, sparingly under stones. *Pterostichus vitreus*, under stones on Skiddaw and other mountains. *P. diligens*, common in moss, near Brampton. Near Carlisle, *P. strenuus*, only appears to occur. *P. vernalis*, sparingly by riversides. *Amara fulva*, banks of the river Petteril. *A. bifrons* and *familiaris*, sparingly met with on the coast near Allonby. *A. lunicollis*, under stones and in moss. *A. trivialis*, generally common on paths, &c. *Anchomenus piceus*, banks of the Petteril. *Bembidium punctulatum*, *tibiale*, and *atrocaeruleum*, common by stream sides. *B. monticola*, in company with the preceding but much less common. *B. stonoides*, several *Bembidia* taken on the banks of a small river, are referred by Mr. Newbery to this species; the colour is distinctly greenish. *B.*

decorum, moderately common in the Petteril and Caldew Valleys. *B. bipunctatum*, one specimen on Burgh Marsh. *B. lunatum*, moderately common on mudbanks on the estuary of the Eden. *B. concinnum*, *aeneum*, *mannerheimi*, and *minimum*, common on mudbanks on Burgh Marsh. *B. savatile*, common by a rivulet near Allonby. *B. pallidipenne*, common on the coast. *B. paludosum*, one specimen by a stream side. *Pogonius chalcus*, under shore refuse. *Patrobis excavatus*, under stones. *Metabletus foreola*, among vegetable refuse. *Brychius elevatus*, in running water near Allonby. *Haliplus ruficollis*, generally common in ponds. *Laccophilus obscurus*, in ponds. *Coelambus inaequalis* and *impressopunctatus*, sparingly. *Hydroporus palustris*, very common. *H. memnonius*, *gyllenhali*, *rufifrons*, *depressus*, *lepidus*, and *discretus*, a few of each. *Agabus guttatus*, very common in small streams. *A. nebulosus*, moderately common. *A. femoralis*, common in a pond on the golf links at Silloth. *A. bipustulatus*, very common. *Platambus maculatus*, a few in a slow running stream. *Ilybius fuliginosus*, in streams. *I. ater*, moderately common in ponds. *Rhantus pulverosus*, a few in a pond. *Colymbetes fuscus* and *Dytiscus marginalis*, moderately common. *Hydrobius fuscipes*, *Anacaena globulus*, *Philydrus nigricans*, *Laccobius alutaceus*, *L. minutus*, and *Linnebius truncatellus*, a few of each. *Helophorus aquaticus* and *H. brevipalpis*, very common. *H. arvernicus* and *aeneipennis*, one of each. *Oethebius bicolor* and *rufimarginatus*, sparingly by sides of ponds. *Cercyon quisquilius*, in dung. *C. littoralis*, in swarms under carrion on the shore at Silloth, very variable. *Cryptophletrum atomarium*, among refuse, estuary of the Eden. *Aleochara obscurella*, under seaweed at Silloth. *Orypoda spectabilis*, under rotten wood. *O. alternans*, common in fungi. *O. longiuscula*, in moss. *Ooalea castanea*, in moss. *Myrmedonia humeralis*, one near Keswick, close by a stronghold of *Formica rufa*. *Astilbus canaliculatus*, under shore refuse. *Homalota depressa*, margin of a stream. *H. vestita*, in dung. *Tachysa flavitarsis*, margin of a stream. *Gyrophaena gentilis*, in fungi. *Conosoma immaculata*, in fungi. *C. livida*, common at roots of grass. *Tachyporus obtusus* var. *nitidicollis*, in moss and under bark. *T. tersus*, in flood refuse. *T. transversalis*, in moss. *Tachinus elongatus*, one by side of a stream. *Bolitobius lunulatus*, by sweeping. *B. trinotatus* and *pygmaeus*, in fungi. *Heterothops binotata*, under shore refuse. *Quedius cinctus* and *impressus*, under stones. *Q. fulvicollis*, one in flood refuse. *Leistotrophus nebulosus*, one taken on the wing. *Staphylinus pubescens*, common in dung and carrion. *S. fulripes*, one fine example under stone, near Keswick. *S. stercorarius*, one specimen under stone on the coast, a little to the north of Maryport. *Philonthus varius* and *sordidus*, in flood refuse. *P. albipes*, in carrion, &c. *P. cephalotes* and *fumigatus*, odd specimens under stones. *P. fulripes*, by stream sides. *P. punctarius*, in moss, &c. *Catius xantholoma*, under shore refuse at Silloth. *Xantholinus glabratus*, in dung, &c. *Othius melanocephalus* and *myrmecophilus*, under stones and in moss. *Stilicus orbiculatus* and *affinis*, roots of grass, &c. *Stenus guttula*, sides of streams. *S. specularator*, *declaratus*, *brunnipes*, *ossium*, and *paganus*, roots of grass. *Bledius subterraneus*, sides of streams. *Orytelus laqueatus*, in dung. *Lestera longelytrata*, sides of streams. *L. sicula*, in moss. *Olophrum piceum*, in moss. *Omalium rugulipenne* and *riparium*, under shore refuse at Silloth. *O. rufipes*, beaten from flowers of willow. *Proteinus brachy-*

pterus, in fungi. *Anthobium sorbi*, from hawthorn blossom. *Eusphalerum primulae*, flood refuse. *Bythinus bulbifer* and *Bryaxis fossulata*, in moss. *Ayathidium varians* (?), in rotting wood. *Cholera agilis*, among dead leaves. *C. velox*, flood refuse. *Coccinella 5-punctata*, one in flood refuse. *Cercus pedicularius*, amongst hay. *C. rufilabris*, by sweeping. *Brachypterus pubescens*, few from tansy. *Epuræa obsoleta*, by beating. *Nitidula bipustulata*, under shore refuse at Silloth. *Omosita colon*, amongst hay. *O. discoidea*, amongst bones. *Cychramus luteus*, beaten from crab flowers. *Rhizophagus cribatus*, by sweeping. *Corticaria pubescens*, in flood refuse. *Antherophagus pallens*, by sweeping. *Cryptophagus dentatus* and *saginitus*, in haystack refuse. *C. scanicus* and *setulosus*, a few swept. *Parnus auriculatus*, sides of ponds. *Onthophagus fracticornis*, *Aphodius inquinatus* and *contaminatus*, in dung. *A. lapponum*, common on Skiddaw and other mountains. *A. ater*, sparingly. *Egialia arenaria*, common among the Solway sandhills. *Geotrupes vernalis*, common in dung and on the wing near West Water. *Anomala frischii*, taken on the golf links at Silloth. *Lacon murinus*, along with the last. *Cryptohypnus dermestoides*, in flood refuse. *Agriotes linearis*, on marshy land, estuary of the Eden. *A. pallidulus*, commonly beaten and swept. *Corymbites cyaneus* and var. *aeruginosus*, from hawthorn, &c. *C. quereis*, commonly swept. *Campylus linearis*, moderately common by sweeping. *Dascillus cerrinus*, one specimen among the mountains. *Helodes minuta*, by sweeping. *H. marginata*, from hawthorn flowers. *Microcara livida*, commonly swept. *Podabrus alpinus*, from various trees. *Telephorus pellucidus*, very common. *T. obscurus*, one from hawthorn near Keswick. *T. lituratus*, by beating. *T. darwinianus*, a few specimens amongst grass and other low herbage, on marshy land, at the estuary of the Eden. *Malthinus punctatus*, by beating. *Malthodes marginatus*, by sweeping. *Dasytes plumbeoniger*, from hemlock. *Aromia moschata*, one taken near Keswick, by Mr. H. A. Beadle. *Torvus meridianus*, also taken by Mr. Beadle, but at Kendal, in Westmorland. *Strangalia armata*, from hemlock, at the foot of Latrigg. *Grammoptera ruficornis*, from hawthorn. *Pogonochaerus dentatus*, under bark. *Donacia dentipes* and *sericea*, among marsh marigold in Borrowdale. *Zeugophora subspinosa*, from elder. *Chrysomela fastuosa*, by sweeping. *Prasocuris junci*, among brooklime. *Galerucella tenella* and *Sermyla halensis*, by sweeping. *Longitarsus jacobaeae* and *melanocephalus*, in grass tufts and by sweeping. *Haltica ericeti*, swept from heath. *Apteropeda graminis*, by sweeping in damp meadows. *Mantura rustica*, roots of grass. *Crepidodera transversa*, *Psylliodes napi*, and *Cassida obsolita*, by sweeping. *Helops striatus*, one among the Solway sandhills. *Anthicus floralis*, a number taken on the wing. *Meloe proscarabeus*, on pathways in meadows. *Atelabus curculionoides*, from oak. *Rhinonacer atelaboides*, from Scotch fir. *Apion rirans* and *humile*, by sweeping and at roots of grass. *A. gyllenhalii* and *erri*, sparingly swept. *A. ononis*, freely swept from restharrow, at Silloth. *Otiorrhynchus atrapteris*, common on the Solway sandhills. *O. picipes*, very common. *O. sulcatus*, in flood refuse. *O. lignus*, under stones, &c. *Strophosomus obsus*, a few beaten. *Darypeithes sulcifrons*, under stones. *Liophloeus nubilus*, a few swept. *Phyllobius alneti*, swept from nettle. *Sitones hispidulus*, by sweeping, &c. *Hypera rumicis*, swept in damp meadows. *Cleonus sulcirostris*, among the Solway sandhills. *Liosoma ovatum*, commonly swept. *Orchestes rusci* and *salicis*, from

sallow, &c. *O. quercus*, from oak. *Erirrhinus bimaculatus*, moderately common under refuse on the Solway. *Gymnetron beccabungae* and *labilis*, sparingly swept. *Anthonomus rubi*, from bramble. *Cionus pulchellus*, from figwort. *Ceuthorrhynchus erysimi*, from swallow, &c. *C. litura*, from thistle. *Ceuthorrhynchidius troglodytes*, by sweeping. *Hylurgus piniperda*, from burrows in Scotch fir. *Trypodendron domesticum*, one on the wing near Keswick. *Brachytarsus varius*, few swept and beaten.—F. H. DAY and JAMES MURRAY, Carlisle.

VARIATION.

ABERRATION OF VANESSA IO.—A remarkable aberration of this most constant species was taken by my wife on August 10th, 1898, whilst staying in South Devon. The lower half of the fore-wings, usually of the deep red-brown colour, which Newman describes as resembling "dragon's blood," is in this specimen, of a dark semi-transparent purplish tint, evidently owing to some abnormal condition of the scales upon that portion of the wings. It is in perfect condition, and the semi-transparent patches (which appear to be somewhat thinly scaled) constitute the only peculiarity. There is a similar aberration more commonly occurring in *Aglais urticae*, of which I have a specimen in my own collection.—P. W. ABBOTT, Sutton Coldfield, Warwickshire.

VARIATION OF HYDRILLA PALUSTRIS.—Among the eight specimens of *H. palustris* which fell to my lot in June last at Wicken Fen, is one somewhat similar to that described by Mr. J. C. Moberly, in the January number of the *Entomologist's Record*—"No. 4 specimen," taken by Mr. S. Bailey, June, 1898. The fore-wings are very dark blackish-brown, the elbowed line and reniform only just discernible, hind wings smoke colour. Another specimen is of a rich fawn colour, all markings very distinct, basal line very sharply angulated, discoidal elongated, forming a short straight line, reniform very large and of the normal shape. I cannot remember having seen any sign of Newman's "violet tint" on any of my specimens.—IBID.

ABERRATION OF VENILIA MACULATA.—Last May I netted in Wyre Forest a peculiar specimen of this species, the whole of the ground colour being smoky-orange, whilst the spots on the costa are coalesced.—IBID.

NONAGRIA ARUNDINIS AB. FRATERNA.—I bred a female specimen of this species (pupa from the Norfolk Broads) last August, anterior wings very dark blackish-brown with a few pale dots on the hind margin, hind-wings with black nervures, apparently *ab. fraterna*. I also bred a female with dark reddish-brown anterior wings from the same locality in 1895.—IBID.

PRACTICAL HINTS.

Field Work for Spring Months: April—May.

By J. W. TUTT, F.E.S.

1.—By collecting teazel heads in April and May and putting them in a bandbox *Eupocilia roseana* will probably be bred in plenty.

2.—In April the imagines of *Aleucis pictaria* may be found at night sitting on twigs or flowers of sloe-bushes. It appears to prefer, in the larval stage, the stunted bushes growing in its special localities.

3.—The larvæ of *Aplecta tincta* are best obtained by searching birch bushes in April by night with a lantern.

4.—The larvæ of *Noctua sobrina* may be swept at night in April and May from *Vaccinium* on our northern moors.

5.—The sawfly catkins collected in April generally contain a very fair number of the larvæ of *Citria flavago*, *C. fulvago*, &c. These feed on the leaves later, and also on a variety of low plants.

6.—The larva of *Depressaria assimilella* is to be found between the united stems of broom in April.

7.—Sweep the open heather at night in May for larvæ of *Agrotis agathina* and *Noctua neglecta*. *Scodiona belgiaria* may be taken on the wing at the same time (Moberly).

8.—The larvæ of *Sesia philanthiformis* always feed in May in the smallest stunted plants of sea pink (*Statice armeria*) growing absolutely on or between the crevices of the bare rocks, and are never found where the food-plant grows luxuriantly in ordinary earth (Meek).

9.—In May the larvæ of *Toxocampa pastinum* may be found full-fed feeding on *Vicia*.

10.—During May the nests of *Eriogaster lanestris* should be searched for on hawthorn and blackthorn.

11.—In May the larva of *Taeniocampa populeti* spins two poplar (or aspen) leaves together, one upon the other, and lives between. The larva is easily seen against the light.

12.—In May *Tethea subtusa* spins a single poplar leaf over on its side and lives within the home thus formed.

13.—The larvæ of *Tiliacea* (*Xanthia*) *citrargo* should be collected in May. They spin together leaves of lime, and are easily seen between the leaves against the sky. They appear to feed at night, and can then be beaten.

14.—The larvæ of *Ellopiæ fasciaria* and *Thera firmata* are to be beaten from firtrees in May.

15.—The larvæ of *Eupithecia sobrinata* can usually be beaten in quantity from juniper during May.

16.—Apple flowers that are spun together with a web should be collected in May for larvæ of *Eupithecia rectangulata*.

17.—In May collect the young shoots of Scotch firs, which are tenanted with larvæ of *Retinia buoliana*.

18.—The larva of *Penthina ochroleucana* feeds on rose-trees (cultivated as well as wild) in May.

19.—The shoots of sawfly collected in May and June should be kept in a flower pot in a cool place if you wish to rear *Penthina capreana* in July.

20.—In May some curved case-like structures may be seen adhering to the twigs of various species of poplar and aspen. These consist of the material thrown out by the larvæ of *Spilonota aceriana* which is feeding within the stem.

21.—The large twisted heads of bramble should be collected in May for larvæ of *Aspis udmanniana*.

22.—During May the larvæ of *Gelechia viscariella* spin up the tops of *Lychnis*.

23.—The pupæ of *Elachista poella* may be collected in early May in sedge leaves on the marshes.

24.—The cases (larvæ) of *Coleophora therinella* are to be found in May feeding on growing thistles.

25.—The larvæ of *Laverna raschkiella* are to be found in May (and again in July) mining the leaves of *Epilobium angustifolium*.

26.—The larvæ (cases) of *Coleophora hemerobiella* are to be found on whitethorn in May, those of *C. ardaepennella* on oak in May, and those of *C. ibipennella* and *C. palliatella* on birch in May.

27.—The larvæ of *Gelechia mouffetella* feed in the shoots of honeysuckle in May.

28.—In the middle of May the roots of sea-plantain should be collected for larvæ of *Gelechia instabilella*.

29.—About the middle of May the conspicuous marks made by the larvæ of *Botys asinalis* on the leaves of *Rubia peregrina* indicate the whereabouts of this species.

N.B.—For similar series of "Practical Hints" for these months *vide* vol. x., pp. 108-109; vol. ix., pp. 95-97; vol. viii., pp. 20-21; vol. iv., pp. 51-52; vol. i., pp. 23-24, and pp. 47-48.

CURRENT NOTES.

At the meeting of the City of London Entomological and Natural History Society, on March 21st, Mr. Prout read an exhaustive paper on the "Life-History of *Oporabia autumnata*, Bkh." He treated it as virtually a distinct species from *O. filigrammaria*, though at present differentiated only by habits, habitat, &c., and not structurally. The three broods he had reared from the eggs (from Scotland) showed slight difference from *filigrammaria* in the 2nd and 3rd, and especially in the adult, larval stages. The distinctness of both from *O. dilutata* was abundantly manifest almost throughout. Mr. Clark's series figured in *Entom. Record*, &c., vii., pl. iii., and probably Newman's second figure (p. 108) are to be referred to *autumnata*.

Will lepidopterists and others who may breed, or otherwise capture, ichneumons, during the coming season, be so kind as to send them, with (where possible) their host's names, to Claude Morley, F.E.S., Crescent, Ipswich, who is commencing the study of these interesting parasites?

Mr. Dalglish's request for lists of captures from those lepidopterists who have visited the West of Scotland, in order to compile a list of the insects of the Clydesdale district, leads us to suggest that, properly managed, the Glasgow Society ought, at this attempt, to bring out a list worthy of the city, the district, and the occasion. Mr. Kenneth J. Morton is evidently the man to revise the whole thing, whilst in Mr. Dalglish we have an ardent micro-lepidopterist, who has collected the district assiduously, and might be ably seconded by Mr. King, (whose collecting has, at least of late years, been largely done out of the district) so far as the Odonata, Orthoptera, Diptera, and Hemiptera, allowed him leisure. We do not know the Glasgow coleopterists, but whilst not forgetting Mr. Fergusson and Mr. Dunsmore, we would urge the Society to call in the aid of the collectors residing (or who have resided) within the district, at Paisley, &c. A careful search through the magazines should be undertaken, as many records lie there forgotten. It is not sufficient for a man to collect a few marked lists and tick the species off. It is most necessary that we get a reliable and carefully-annotated list for the west of Scotland. The recent work that we have been engaged upon shows that, practically, with the

exception of the more conspicuous species, the west and south-west of Scotland are practically unknown ground. It rests with the Glasgow Society to utilise wisely the forces at its disposal, and produce a list of the insect fauna of the district which will make such a statement as this impossible in the immediate future.

We have to notice an excellent paper by the Hon. N. C. Rothschild, entitled "Contributions to the knowledge of the Siphonaptera" (*Noritates Zoologicae*, v., December, 1898). The new material relating to the exoskeleton of the *Pulicidae* is of the greatest importance, whilst the descriptions of new species and the excellent plates by means of which the paper is illustrated, will make it of the utmost value to specialists. The species dealt with are: *Typhlopsylla agyrtes*, Tasch., *T. agyrtes* subsp. *nobilis*, n. subsp., *T. dasycnemus*, Roths., *T. pentacanthus*, Roths., *Ceratopsylla elongatus*, Curtis, *C. octactenus*, Kol., *C. intermedius*, sp. nov., *Stephanocircus mars*, sp. nov.

At the meeting of the Entomological Society of London, held on February 1st, Mr. Champion exhibited three specimens of an interesting species of *Fulgoridæ*, *Atalanta auricoma*, Burm., recently received from British Honduras, from M. Blancaneaux, and stated that he had found lepidopterous larvæ in the white waxy matter attached to the body of an allied species, *Enchophora stellifer*, Burm., in Central America, of which insect he exhibited a specimen, together with a larva taken from it. This larva was very like that of *Epipyrops anomala*, Westw., an Arctiid which is attached to *Fulgora candelaria* in a similar way, and which is figured in the *Transactions of the Ent. Soc. London*, 1876, Pl. vii. The same gentleman also showed numerous specimens of both sexes of an undescribed species of *Apimereus* (Family, *Reduviidæ*) found by himself in Chiriqui, and pointed out some of the more interesting peculiarities of each sex.

For some time we have been quite unable to supply copies of the *Monograph of the British Pterophorina*, the work being practically out of print. We have just received a few copies of the book, which can be sent out at the advertised price, but it is evident that the price of the book will have to be permanently raised for such copies as may fall into our hands later.

Stichoglossa semirufa, Er., a species of *Staphylinidae* new to the British list, has been taken by Mr. Harwood, near Colchester, by beating oaks in May last (*E.M.M.*, March, 1899). In the same number Mr. W. E. Sharp records *Phytosus nigriventris*, Chev., from Flintshire.

Mr. Harwood records (*E.M.M.*, March, 1899) among other Myrmecophilous coleoptera, from Colchester, *Hister marginatus* with *Lasius fuliginosus* and *Formica rufa*, and *Heterothops quadripunctata* with the latter ant. Neither of these species are mentioned by Wasmann in his *Myrmekophilen und Termitophilen Arthropoden*, 1894. It is the first record of the *Hister* occurring with ants. The *Heterothops* in the nest of *Formica rufa* confirms Mr. Donisthorpe's record (*Ent. Record*, October, 1897), it having only been known to occur with *L. fuliginosus* before.

One of the most charming series of books on lepidoptera ever published is, undoubtedly, Oberthür's *Études d'Entomologie*. The latest volume, entitled "De la variation chez les Lépidoptères" has just come into our hands, and fully maintains the reputation of the series, not only in the magnificent way in which the letter-press and plates are

printed, but also in the extensive array and scientific value of the aberrations which are figured. The aberrations of the Polyommataids, Chrysophanids, and Anthrocerids, as well as the marvellous series of aberrations of *Spilosoma lubricipeda*, *S. menestrii*, *Arctia caia*, *A. rillica*, *Abraarax grossulariata*, &c., are simply marvellous. The work is essentially British in the best sense, the material having been largely purchased from the best British collections and arranged side by side with such forms as have been obtainable from other Palaearctic localities. It is not only an important contribution to science, but a work of art, such as only a scientific man who is at the same time one of the first printers of the day, could produce. The work is of course published by M. Oberthur himself at Rennes, France.

NOTES ON COLLECTING, Etc.

PHLEGETHONTIUS (SPHINX) CONVULSUS IN THE FAR EAST.—As I see by the entomological magazines that *Phlegethontius (Sphinx) convulsus* has been unusually common at home during the late autumn, it may be of interest to note that it has also been unusually abundant out here. In 1896 I did not see a single specimen, and in 1897 the only trace of the species was a pupa which I found at Kamakura, near Yokohama; but this year, towards the end of August and beginning of September, *P. convulsus* was abundant at Chifu and Wei-hai-wei, so that scarcely an evening passed without there being brought to me at least one individual, which had been attracted by the electric light. The simultaneous abundance of this intermittently common species at the very extremities of its range across the great Euro-Asiatic continent seems to me noteworthy, and it would be interesting to ascertain whether the moth was also unusually abundant in other localities in which it occurs in continental Europe.—T. B. FLETCHER, F.E.S., H.M.S. Centurion, at Hong Kong, December 24th, 1898.

BREEDING CAMPTOGRAMMA FLUVIATA.—I was fortunate enough to obtain two dozen eggs of *Camptogramma fluvjata*, from my friend Mr. Hodges, laid by a ♀ taken September 13th. Eighteen of the larvæ grew up rapidly, the last emerging yesterday, November 18th. Four of them grew very slowly, two of these died on Nov. 19th, whilst two larvæ were still feeding on at that date. At first I fed them on knotgrass to which they took very well, and when knotgrass disappeared I found dock an equally efficient substitute. The eighteen larvæ that fed up produced imagines during the first fortnight of November.—A. W. MERA, 79, Chapel Road, Forest Gate, E. November 19th, 1898.

LAPHYGMA EXIGUA AND LEUCANIA VITELLINA IN DEVONSHIRE.—I ought perhaps to record the capture of one example each of *Laphygma exigua* and *Leucania vitellina* in South Devon at the end of August last. With the exception of *Peridroma saucia* and *P. pyralis*, insects were much scarcer in South Devon in 1898 than they were in 1897.—(REV.) E. C. DOBREE Fox, Castle Moreton Vicarage, Tewkesbury.

REARING ASTEROSCOPIUS SPHINX.—I have reared the larvæ of *Asteroscopus sphinx* on whitethorn and blackthorn. I have beaten them off these trees in Monk's Wood, Hunts, and never find them cannibals unless short of food. In the New Forest I only beat them off oak, but have taken them here off wych elm, and have always fed them on the naturally chosen food-plant. The arrangements (in confinement)

for their pupation are generally unsatisfactory. They go as deep as they can in a pot, and I fancy one is enough in each pot, or they disturb one another.—E. A. BOWLES, M.A., F.E.S., Myddelton House, Waltham Cross, Herts.

NOTE ON *POECILOCAMPA POPULI*.—The eight pupæ of *Poecilocampa populi* mentioned *ante* p. 51, increased to ten by the end of November. These pupæ produced 7♂ and 1♀ (two were ichneumonised). The female emerged December 6th, and laid most of her eggs the following day.—R. B. ROBERTSON, The Holt, Berkeley Street, Cheltenham. December 6th, 1898.

AUTUMNAL WORK IN DEVONSHIRE.—Last autumn, 1898, was a fairly good one for *Asteroscopus sphinx*. Besides this species, however, I have taken little, although from two or three beatings of thatch I have taken the following in more or less numbers, namely:—*Ornoides heracleatyla*, *Cerostoma radiatella*, *Teleia humeralis*, *Coriscium bronquartellum*, *Depressaria arenella*, *D. ocellana*, *D. propinquella*, *D. ciliella*, *D. albipunctella*, *D. chacrophylli*, *D. appana*, *D. ultimella*, *D. yratiana*, *D. nerrosa*, *D. heracleana*, *D. alstroemeriana*, *Larerna decorella*, and *Amphibia longiella*. I also took, on January 3rd, one *Coriscium sulphurellum*. Pupa-digging is an amusement I hardly ever indulge in. This neighbourhood is so thickly wooded that one hardly knows where to turn, and it gives but poor results. I take *Chloephora undulans* here in August, and again hibernated in spring, but have never found them paired. In fact I have never beaten two together; probably they pair at night, so one would not be likely to see it.—E. F. C. STUDD, M.A., B.C.L., F.E.S., Oxtou, Exeter.

PLUSIA MONETA AND *ACHERONTIA ATROPOS* AT ENFIELD.—YELLOW ABERRATION OF *CALLIGENIA MINIATA*.—Larvæ of *Plusia moneta* have turned up again this year in the garden, so it must be fairly well established. I must not leave out one good New Forest capture, and that was a bright yellow *Calligenia miniata*. *Acherontia atropos* also has turned up sparingly here this year, only six larvæ being captured to my knowledge; it seems to visit a garden about a quarter of a mile from this house every year, as a larva has been brought me from this garden for the last four years.—H. M. EDELSTEN, The Elms, Forty Hill, Enfield.

EUPLEXIA LUCIPARA IN FEBRUARY.—On February 16th my brother captured here a specimen of *E. lucipara*, in fine condition. I believe this is very unusual.—R. S. GORDON, F.E.S., Corsemalzie, Whauphill, Wigtonshire, N.B.

NOTE ON *AGROTIS AGATHINA* IN 1898.—I failed utterly with *Agrotis agathina* larvæ, and the few I bred were miserably small. The wild moths were out from August 18th. They only fly for about three-quarters of an hour, just at dusk, and are then not difficult to net by the aid of a lamp, as they do not fly fast, and are very quiet in the net. However, the weather was against me, as it became so windy that a net was practically unmanageable on most nights, and not a single specimen came to sugar, though other species were abundant. The first heavy rain, too, completely destroys them, and after a week not a decent specimen was to be found. I may add that at the end of August I visited the ground where I usually get *Cirrhoedia xerampelina*, but the result of many expeditions was six specimens only.—(Rev.) C. D. ASH, B.A., Skipwith Vicarage, Selby.

CAPRICIOUS EMERGENCE OF LEPIDOPTERA.—Pupæ kept indoors in a cold room without a fire last year, emerged capriciously, and the dates may prove interesting, *e.g.*, *Dianthoeia capsophila* (from ova collected in the Isle of Man, in May, 1897) emerged June 22nd (1), 25th (3), 27th (1), 28th and 30th (1 each day), July 5th (1), 12th (2), 21st (1). *Leiocampa dictæoides*, reared from ova, emerged May 19th, July 25th, and August 4th, all from the same batch of ova, while a few pupæ have “gone over.” Is this the case in a state of nature? We occasionally get specimens at light here in August, apparently freshly emerged. Another curious thing was the unwillingness shown by *Ennomos fuscantaria* to pair in captivity. I have never had any difficulty in obtaining pairings in former years, but this year, though I sacrificed most of my specimens, I only obtained one pairing, and all the ova from that were infertile, the nights were bitterly cold at the time, which may account for it.—*IBID.*

ENNOMOS AUTUMNARIA, ANTHROCERA FILIPENDULÆ AB. FLAVA, &c., AT SHOEBOURNNESS.—I was allowed a short time since to inspect a small collection of moths formed by a bird-stuffer at Shoebourness. It includes a specimen of *Ennomos autumnaria* taken at sugar last year, and a beautiful yellow *Anthrocera filipendulæ*, as well as *Sphinx convolvuli* among other good things. I may add that *Brotomia meticulosa* occurred last autumn in extraordinary numbers, whilst *Scopelosoma satellitia*, usually common, was not seen.—F. G. WHITTLE, 3, Marine Avenue, Southend.

FOOD-PLANTS OF TRICHIURA CRATAEGI.—The notes on *Trichiura crataegi* interest me greatly. I find a consensus of opinion that *Crataegus oxyacantha* is the food-plant upon which it is usually found, which makes it all the more strange that, though I have largely beaten bushes of that plant in the immediate vicinity of the bushes of *Salix cinerea*, from which I have invariably beaten these larvæ in the New Forest, I have never beaten one out of *C. oxyacantha*. They are always rather scarce with us, in some seasons practically absent. I have, however, beaten them, in most years, in the first week in May, when they are very small, but more usually, in the first and second week in June, when they are a half or three-quarters grown.—J. C. MOBERLY, M.A., F.E.S., 9, Rockstone Place, Southampton.—[What are the known food-plants in Scotland? Will Messrs. Horne, Reid, or some other of the Scotch lepidopterists tell us?—*ED.*]

Trichiura crataegi is not at all common here but one or two larvæ turn up most seasons, and I think nearly always on hawthorn.—F. G. WHITTLE, 3, Marine Avenue, Southend.

With regard to the food-plant of *T. crataegi*—I used to get the larvæ in Essex many years ago—and always on the young shoots of the hawthorn. The same has been my experience here, where the species turns up occasionally, though it is never common. A hawthorn hedge at the bottom of my garden, and one bordering a neighbouring field, are my chief hunting-grounds, and I have found it nowhere else, though there is any amount of willow close by.—(REV.) C. D. ASH, B.A., Skipwith Vicarage, Selby.

QUERY AS TO PAIRING CYMATOPHORA OCULARIS.—Can any one give me information as to the pairing of *C. ocularis*—whether they are easy to pair or otherwise? I should be much obliged for anyone's personal experience.—(MAJOR) R. B. ROBERTSON, Southborne Road, Boscombe, Hants.

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AND

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Variation of *Hydrilla palustris*, with description of two new aberrations.

By WILLIAM FARREN.

It may be well to follow the notes of Messrs. Moberly and Studd (*ante*, pp. 23-24) on the variation of *Hydrilla palustris*, with a description of the specimens I have captured, together with some account of the occurrence of the species in the Cambridge Fens in June, 1898.

I believe the first specimens were taken by Messrs. Abbott and Hodges, on June 11th. I took my first on the 14th and last on the 19th, twelve specimens in all, one of which was only a fragment, and one fell to the share of my friend, Mr. Alfred Jones, who was working with me on the 18th and 19th. My best night was the 15th, when I took seven. The weather was not at all good for "light," for although the nights were dark there was a prevailing north wind, and it was very cold. A heavy fog spoiled the 16th and 17th. The majority of the specimens taken came to "light" between 12 p.m. and 1 a.m.; I took one as early as 11.15 p.m., and one as late as 2 a.m. Altogether there appear to have been about 50 specimens taken, Messrs. Abbott and Hodges, working together, heading the list with about 18; Mr. Studd, 5; Mr. Bailey, 5; Mr. Houghton, 4; Mr. Martin, 2; and my own, 12.

H. palustris is undoubtedly one of those species which, for some reason, have their good years, and these apparently few and far between. So far as its history in this country goes, there would appear to have been only two of the good seasons noticed, *viz.*, 1877 (I am not quite sure that it was not 1876) and last year, 1898. I believe up to 1877 (? 1876) that there had been no further records than appear in Newman's *British Moths*. Then came the "good year," when about 20 specimens were taken. Some of these were captured by Mr. W. H. B. Fletcher and Dr. Wheeler, others by Rawlinson, Bailey, and Houghton. I think I am right in saying that it was in the same year that one was taken by Mr. Scholfield on Quy Fen, and another by Mr. James English on Bottisham Fen, the latter is the specimen in the "Double-day" collection. The capture of the two last mentioned specimens prompted me to try the outlying fens, where I took the majority of my specimens last June, although, for obvious reasons, I do not disclose the exact spot.

Very few specimens appear to have been taken between 1877 and 1898. Mr. Bailey took one in 1883, and Messrs. Hodges and Hough-

ton met with it in 1894, and also, I believe, in 1892 or 1893. Some were taken in 1897, in which year I took two, and to these may be added the two ♀s recorded by Mr. Day (*ante*, vol. x., p. 110), captured at Carlisle, one in 1896 and one in 1897. These last are, I believe, the only recorded British ♀♀.

It would be well if collectors having definite knowledge of the capture of *H. palustris* in this country would supplement, and correct, these statistics. It is not easy to account for the erratic appearance of this species, and a reliable history of its appearance in England would be interesting and instructive.

The type description quoted in Tutt's *British Noctuae and their Varieties*, p. 143, is fairly accurate for many of our specimens. "Male of a greyish-brown colour, with one irregular transverse basal line, traces of the reniform, and two transverse lines (roughly parallel to the hind margin) outside the reniform." To it might be added that the orbicular appears as a black spot, or short horizontal streak, just beyond the basal transverse line. The outer of the "two transverse lines outside the reniform" is not sufficiently defined to call a "line," being rather what is generally described as a "shade" (by which term I shall refer to it when describing the aberrations). The wings, which are ample and delicate, are very silky in appearance, and especially, when fresh, have a faint rosy or purplish tinge, quite sufficient to give warmth to the general colouring. I am aware that this last statement is directly contradictory of what Messrs. Studd and Moberly have written, but I have five of my specimens by me now, three good and two rubbed; all of them have the rosy tinge, and I think hardly less so than when freshly caught.

It would appear that *H. palustris* is subject to considerable variation, but chiefly in the intensity of colour and markings. The basal transverse line is sometimes very indistinct, and varies somewhat in form; the most distinct markings are the stigmata and the transverse elbowed line beyond. Only two forms seem to call for special description and varietal names. These are:—

(1) *ab. lutescens*, n. ab.—The forewings of a distinct and clear ochreous-brown, without any of the grey of the type, having the basal transverse line, stigmata, and transverse line beyond, more or less well defined (as in the type), but always without a trace of the subterminal shade. This is a very constant and distinct aberration, apparently comprising about one-third of the specimens taken. Mr. Studd's No. 1 (*ante*, p. 24) would appear to be of this form.

(2) *ab. fusca*, n. ab.—Markings as in the type, but the basal two-thirds of the anterior wings, so darkly fuscous as to almost obliterate the basal transverse line and stigmata; this almost black coloration extends to, and is sharply limited by, the transverse line beyond the reniform; the terminal third of the wing is coloured as in the type, but darker, and has the subterminal shade. Of this I took a single specimen. Mr. Moberly's No. 4 (*ante*, p. 23) is possibly a still darker specimen of this form.

Entomological Notes from the Riviera.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Continuing my notes (*ante*, pp. 96-98), I have to report that March 8th and 9th have been wet and cold, and on the latter, having

a nice (?) wet day for the purpose, I have been examining the larva of a *Spilothyrus* on mallow, and speculating as to the significance of the disproportion between the size of the head and of the prothorax in Hesperids. It is a character of the whole family, and not so far as I know of any other. Such isolated cases as that of *Moma orion* are not precisely similar, and must have a totally different meaning. There are various indications in the structure of all stages of Hesperids that they arise from a *Cossus*-like form, but we have nothing preserved to the present day of the intermediate stages, though *Castnia* and, even more doubtfully perhaps, some other forms are probably side-branches somewhere by the way. We are left, therefore, very much to speculation as to how such a larva as that of a Hesperid can be derived from one like *Cossus* or *Hepialus*. Of the few tangible points that strike me about my *Spilothyrus*, and a similar observation would be correct I think about the few other Hesperids I have seen as larvæ, a chief one is that the larva does not eat any portion of its nest on the one hand, nor does it go far afield for its food on the other. It turns over a corner of a leaf, or takes two pieces of leaf to make its nest, and eats portions of the leaf or leaves so used, but does not go to another one, though it will leave its nest to a distance of twice its own length. Other larvæ that make nests very commonly vary from this in one or other of two ways, they either eat portions of the nest, or they go a great way off for their food. Tortricids for instance commonly turn in a margin for food, and as they eat it away roll over more leaf. *Gelechia populella* and many others do the same. *Charaxes jasius* on the other hand, I refer to *jasius* as I have it by me and so find it occur to me more readily, goes to another branch for its food; and this is the rule I think for larvæ like *C. jasius*, whose nest is not a closed one, but a pad of silk, exposing the larva on the surface of a leaf. Gregarious larvæ, whose nests are conspicuous, like *Porthesia chrysorrhoea*, *Eriogaster lanestris*, *Cnethocampa pityocampa* are rarely particular in this matter, and some like *P. chrysorrhoea* give a very ruinous appearance to their nest and its vicinity, making it look like the result of severe damage to the tree by storm or blight. Other nest-makers have even more curious and definite habits, such for example as the Xyloryctrias. I take it for granted then that there is a certain tendency more marked in Hesperids than in any other nest-makers, to do their feeding outside the nest, but at a point as close to the nest as possible. My *Spilothyrus*, though certainly by no means belonging to the lower section of the family, presents a character that often appears in the family, and is, therefore, probably present in the lowest groups, and is more or less a family characteristic, that is, that the body is of a neutral grey tint, whilst the head and prothorax are coloured, the head black, and the second segment black and yellow. I find further that there is a little more freedom of flexure at the second segment than elsewhere. I assume then that the original *Cossus*-like larva living in the interior of stems, of probably grass-like plants, came to the exterior, perhaps by eating up the central bud of the plant, and then drew together the leaves around for protection. Acquiring thus an appetite for green leaves rather than interior structures, it still felt it impossible to protrude more than its head from its nest, either as a matter of habit, difficult to overcome, or under the compulsion of watchful enemies. A narrow second segment would then

allow greater movement to the head in different directions, and the command of a wider area for feeding would be attained. The same object could no doubt have been attained in different ways, but this appears to have been the way in which *Hesperia* managed it. The original forms were no doubt dominated by the peculiarities of the food-plants of the earliest species, possibly grass-like plants, which enabled a narrow opening between inner leaves to be used to reach outer ones. Many forms still carry the impression made by the fact that the head and prothorax were the normal ones to be exposed. The large size of the head is often marked, but is not greater than in many other families, but looks so owing to the small second segment. An object all larvæ have in view is to obtain as large a head as possible or rather as quickly as they can. Their food-supply depending on the size and power of their jaws, many larvæ pass only a few days at each stage, rushing to the last stage as rapidly as possible, and then, having attained a large head and powerful jaws, remain three or four times as long in this stage as in any previous one, and, even allowing for their greater size, do very much more feeding than at any previous stage. This makes it evident that the object *Hesperia* had in view could not have been satisfactorily attained by diminishing the size of the head as well as of the second segment.

On March 12th a little sunshine found its way through a haze of high clouds, the first for seven days, the air, however, was very warm, and *Gonepteryx cleopatra* was seen in Cannes. At Grasse the only butterflies seen were *Pieris rapæ* (and other Whites?), *Vanessa io*, *Chrysophanus phlaeas*, and *Pararge megera*. No trace of *Polyommatus baton*, *P. cyllarus*, *Eurynome plumistrata*, &c. A fine *Leucania l-album*, newly emerged, was sitting on a stone; a rather less than half-grown larva of *Heterogynis penella* was found about 800ft. above Grasse, and higher up four old female cocoons, together under a stone. Larvæ of *Arctia* (? *pulica*) were found under stones. The chief use of Arctian hairs seems to be for protection against enemies in such situations as this, rather than against birds or for warmth, though probably subserving both purposes. On March 13th I took some beetles and one large ant-lion larva out of sand, at La Bocca; the weather was very dull but warm, and very few butterflies observed.

Three or four days ago, on Mont Fial, I took a larva from a silken tunnel amongst grass roots under a stone. It is active, about 1·lin. long, tapering a little, smoky (nearly black) in colour, and reminds one a little of *Hepialus*, but more perhaps of *Agllossa* (*cuprealis*, &c.). Its head and a large plate on prothorax are brown; the skin is very finely shagreened; the meso- and metathorax also the abdominal segments, with two subsegments; tubercles i and ii trapezoidal, iii supraspiracular, iv and v close together, small, vi and vii also close together and small.

On March 14th *Papilio podalirius* was first seen, and *Spilothyrus alceæ* emerged. Its resting-habit is very curious, with deflexed wings, antennæ parallel with costa, but at some distance therefrom, abdomen curled back over head. On March 15th *Gonepteryx cleopatra* was common, and *Euchloë euphenoides* was frequent in the Esterels. On the 16th several *Papilio podalirius* were seen, the first *P. machaon* was noticed at Auribeau; *G. cleopatra* was flying freely, but I saw only two *Anthocharis belia* and two *E. euphenoides*; I captured one *Pieris daphni-*

dice, worn, also one *Coenonympha pamphilus*; *Pararge egeria* was getting worn. I have seen no *F. cardamines*. I am feeding the antlion larvæ with small Noctuid larvæ; they draw them down beneath the sand before beginning to devour (?) them. I also captured one large female *Spilosoma fuliginosa*. On March 18th, at Trayas and Mal Infernet, *G. cleopatra* was abundant, and there were plenty of *Eugonia polychloros*. *Pararge egeria*, *P. megera*, *E. euphenoides*, and *Saturnia pavonia-minor*, were frequent. *A. belia* was seen, and the first two *Thais medesicaste* captured. *Macroglossa stellatarum* were seen in cop. I captured also two full-grown larvæ of *Charaxes jasius*.

On March 17th I came across a beekeeper about to have a swarm of *Apis mellifica*; the swarming season here is said to be at the latter end of March and in April, so that this was an early one. His hives, which lasted he said about twenty years, and some of which looked about that age, consisted of the cork taken from the tree in one piece, and closed together again, forming an irregular cylinder, about a foot in diameter and two feet long, closed by a piece of cork at the top, but with the end open, the bottom being placed on the bare ground. This, he said, made their removal to the mountains in summer much easier than if there was a board beneath. August, in the mountains, was the best season, and the honey was taken just afterwards. During winter the bees did nothing, but winter must be short for swarming to take place in the middle of March. His method of hiving the swarm was interesting; he wore a bee-veil, the swarm being at the top of a branch of an olive tree. He threw a rope over a branch of the tree, and with this slung the hive tolerably near the swarm, the rope being round the middle, so that the hive was horizontal instead of vertical, and with the bottom forming a wide open end. He shook the bees in and then left it for stragglers to follow in, placing it in its proper position later. He had heard of bar-frame hives, but knew nothing of them nor of their working. This station presented some fifty hives, and he had a larger apiary some miles off. I could ascertain nothing about the usual yield of honey.

On the 20th I made an excursion to the Var with M. Constant. We were too early for the species to be found there in spring. M. Constant used to find here large tracts of uncultivated land that afforded many good species, and so lately as two years ago there were still a few good patches left. Now the whole area is under garden cultivation, and this hunting ground spoiled. The land is most prolific; we saw cauliflowers five feet in circumference and peas eight feet high.

A comparison with the insects in M. Constant's cabinet shows that the insect recorded (*ante*, p. 97) as *A. tagis*, taken at St. Cassien, is really the var. *bellezina* of that species, and my first *F. euphenoides* that had also puzzled me, and which I was inclined to consider a hybrid *cardamines* x *euphenoides*, is really *F. gruneri*. I do not know whether this has been previously recorded from western Europe.

Migration and Dispersal of Insects: Orthoptera.

By J. W. TUTT, F.E.S.

(Continued from p. 93.)

The South American *S. paranense*, to which we have already referred, is a constant inhabitant of the country around the river Plate, where,

normally, it does but little damage, but in the months of October and November, 1891, the insect increased far beyond its usual numbers, and invaded the western and south-western regions of the Argentine Republic. Burr states that they were so abundant in Buenos Aires in 1891, that they were crushed in thousands upon the railway, and the lines being greased as it were by their dead bodies, the trains, in some instances, were stopped. These swarms gradually spread towards the Andes, and by the middle of December had entered southern Chili. This Argentine species is described as having "a dull yellowish-green coloured thorax without any reddish stripe." This at once distinguishes it from the allied sedentary Chilean species, *S. cancellatum*. The Government immediately took the matter in hand, and the official who was sent to report on the invasion found that the locusts had invaded southern Chili in millions. He says:—"They had entered near Villa Rica, about lat. 39° south, at 4000 feet above the level of the sea. Immense numbers had died in the snowy pass, but the survivors had devoured the poor Indians' crops of beans, potatoes, and tobacco. Having rested and fed, they formed two columns, one flying north-west and the other south-west. A few days afterwards some forty tons of eggs, according to a rough calculation, were laid. I had reason to believe that there were two or three other invasions by passes more to the north."

The report that was handed in to the Chilean Government resulted in a sum of 200,000dols. being voted to defray the expenses of destroying them, but the following April so many of the eggs hatched, and the larvæ at once did so much damage, that the same official was appointed to exterminate them. He found them principally on ground quite incapable of supporting them until they reached maturity, and, by a policy of "masterly inactivity," he allowed the larvæ to starve themselves, so that in a few weeks they had all died out.

At the same time news of another invasion into the country reached the official. On this occasion the swarm appeared near the origin of the Bio-bio, and on March 26th he "reached a wood where every tree was coated with such a layer of winged locusts that the bark was not visible. Next morning showed that, for miles around, the country was carpeted with locusts innumerable." These specimens, which are supposed to have been the progeny of the earlier Argentine immigrants showed characters intermediate between *S. paranense* (the Argentine species that entered Chili) and *S. cancellatum* (the sedentary Chilean species). So marked was this, that the official suggests that *S. paranense* and *S. cancellatum* are the same species. All the Bio-bio swarm are reported to have died during the succeeding winter, or to have been eaten by birds, whilst the larvæ resulting from the eggs laid by them were destroyed whilst small.

In South Africa locusts have done considerable damage at irregular periods. In 1896 Distant reported that on one morning in November immense swarms stretched, without intermission, from Bellair to the Congella Valley, and young mealie fields and vegetable patches were, in many places, utterly spoiled. Part of a swarm passed over Durban, but did not settle, whilst swarms were seen on the back beach, and, although they were keeping pretty close to the ground, a westerly breeze drove them rapidly out to sea. Numbers of dead locusts, which had been washed up by the waves, were piled up in a line along the beach,

and, as the breeze freshened during the day the work of destruction increased.

In 1891 considerable damage was done by a species of locust (*Chortoloma australis*) in South Australia, which migrated south in search of food. This swarm travelled scattered, and not very high, never in clouds. There are a considerable number of records of migrating swarms of locusts that have been observed in the antipodes.

No chapter on the migration of locusts could be written without reference to Darwin's own observations on the subject. He writes (*Voyage of the Beagle*):—"Shortly before we arrived at Luxan we observed to the south a ragged cloud of a reddish-brown colour. At first we thought it was smoke from some great fire on the plains, but we soon found that it was a swarm of locusts. They were flying northward, and, with the aid of a light breeze, they overtook us at a rate of ten or fifteen miles an hour. The main body filled the air from a height of twenty feet to that, as it appeared, of two or three thousand feet above the ground, and 'the sound of their wings was as the sound of chariots of many horses running to battle,' or rather, I should say, like a strong breeze passing through the rigging of a ship. The sky, seen through the advanced guard, appeared like a mezzotint engraving, but the main body was impervious to sight; they were not, however, so thick together but that they could escape a stick waved backwards and forwards. When they alighted they were more numerous than the leaves in a field, and the surface became reddish instead of being green. The swarm having once alighted, the individuals flew from side to side in all directions. Locusts are not an uncommon pest in this country; already, during this season, several smaller swarms had come up from the south, where, as apparently in all other parts of the world, they are bred in the deserts. The poor cottagers in vain attempted, by lighting fires, by shouts, and by waving branches, to avert the attack. This species of locust closely resembles, and, perhaps, is identical with the famous *Gryllus migratorius* of the East." The *Gryllus migratorius* here referred to by Darwin is probably the species known as *S. paranense*.

Darwin further relates (*Origin of Species*, p. 329) that in 1844 swarms of locust, visited Madeira. "They were in countless numbers, as thick as the flakes of snow in the heaviest snowstorm, and extended upward as far as could be seen with a telescope. During two or three days they slowly careered round and round in an immense ellipse at least five or six miles in diameter, and, at night, alighted on the taller trees, which were completely coated with them. They then disappeared over the sea as suddenly as they had appeared, and have not since visited the island."

A remarkable swarm of a species of cricket (*Gryllus*) is recorded in *Insect Life*. The account states that on September 9th and 10th, 1890, at Gainesville, Texas, a flight of crickets was observed, accompanied by a small dark beetle, about half an inch in length, which proved to be *Harpalus gravis*. They appeared to fly in an easterly direction. At the same time flights were reported from Dallas, Texas, with a remark as to their being attracted by the electric lights, and in Waco the stone base of the city hall was black with their moving masses. It was stated that there were enough here to make several cartloads. All night restaurants were compelled to close. Large quantities of the

crickets having been swept into the gutters, both here and at Fort Worth, they produced a nauseating stench. Gilbert White records an invasion of a house by a swarm of *Gryllus domesticus*, which they entered from all quarters, flying with an undulating flight like that of some of our small birds.

In concluding our notes on the migration and distribution of the Orthoptera, we may mention the oft-repeated observation of the movements of cockroaches from house to house. One of these was detailed (*Insect Life*, vii., p. 349) by Howard, at length. He states that in September, 1893, a vast army of *Phyllodromia germanica* was observed crossing the street (? at Washington) on a dark drizzly day. The army issued from the rear of an old restaurant fronting upon Pennsylvania Avenue, and marched across the muddy street, undeterred by pools of water, &c., to the front of the building, a machine shop, opposite. The men vainly attempted to sweep back the cockroaches with brooms, and at last laid a line of hot ashes along the side walk, this proving an effective barricade. The cockroaches were diverted, and at once entered the adjoining buildings on either side. It is said that the march continued for two or three hours, that many thousands of insects crossed in this way, and that nearly all the individuals were females carrying egg-cases. Enquiry at the restaurant elicited the information that no special means had been taken to get rid of the insects, and Howard presumed, therefore, that it was a case of true migration, due to the over-population of the restaurant, whose resources could no longer support the prospective increase of the about-to-be-born young. He supposes that "the maternal instinct originated the migratory instinct, and that the army started on its journey at once for more commodious quarters. The darkness of the day is significant, and there is no reason to suppose that similar migrations do not frequently occur, but undoubtedly, under ordinary circumstances, at night." He adds that "this is the way that new houses become infested with cockroaches."

It were easy to fill a volume with records similar to these, which must be taken merely as a fair sample of a much greater number. Enough, however, has been written to show how frequently swarms of these destructive insects have been observed. It appears probable, from the evidence offered by the various records, that erratic as the movements of "locusts" generally are, their migrations are more or less directly connected with food-supply, that they are indeed foraging expeditions, and, so far as any return to the land from whence their ancestors have come takes place, it appears to be equally due to dispersal in search of food. The Algerian visitations show this. They arrive in an adult state from the parched south when vegetation is at its best in Algeria, the immigrants lay eggs, and the young find an abundance of food. These become adult in July, just as the country that has reared them becomes parched and the vegetation dried up. Then they are said to fly south again, possibly to lands that are now fitted again to support another brood, although it must be confessed that much more exact evidence as to these reputed return swarms is needed. Our knowledge of the "return swarms," mentioned in relation to the American species, is also most unsatisfactory, and is so ill-defined that generalisations on the information at hand are almost impossible.

It would appear to us that in certain districts, which are the real sedentary home of the migratory species, normal conditions of food,

temperature, and natural enemies keep their abundance fairly constant. A combination of favourable conditions for the increase of the species, however, occasionally presents itself, and then the locusts are developed in abnormal numbers. The competition between themselves for food leads to their dispersal as larvæ, and to their migration as adults. Such emigrants that pass beyond the normal limits of their geographical area are, however, subjected to entirely new conditions of environment, and especially to those of temperature, and this prevents the permanent extension of their area, for their organisation, fitted as it is to respond to the environment whence they came, may be utterly unfitted for that of the new environment in which they find themselves. A few days of unusual cold, humidity, or drought, may be fatal to eggs, larvæ, or adults, and the natural work of extermination is begun. Hence the influx of immigrants rarely results in the permanent extension of the geographical limits of any species, and many countries that have for thousands of years been visited by migrating swarms of a certain species still refuse that species a place in their permanent fauna. It would appear that the insects love comparatively dry soils, in arid and warm districts, and that, therefore, excessive humidity is more likely to be a factor in preventing their permanent spread than excessive drought. They seem also to be sensitive to a low temperature (Riley notes that the locusts, late in autumn, are often killed off by a frost or snowstorm), and, therefore, a combination of wet and cold atmospheric conditions is more likely to be fatal than any other.

If, as we suspect, the migration instinct of locusts be more or less directly connected with the food supply, one may readily find a suggestion as to whence the more recently evolved orders—as represented by butterflies, moths, flies, &c.—derived their migrating instinct, for these orders have probably been developed from some ancestral form of insect closely allied to the locust of to-day, with a capacious appetite in all its stages. It is evident that, however intimate may be the connection between the migration of locusts and their food supply, the latter cannot now be the direct cause of the migration of butterflies and moths. We have seen, however, how the original migrating instinct in these species probably came into being, and how old and deep-seated a habit, if we may so term it, is the tendency to migration.

The Variation of *Oporabia dilutata*.

By LOUIS B. PROUT, F.E.S.

In working at the genus *Oporabia*, of late years, I have attempted to tabulate the principal forms of *O. dilutata*, Bkh., and find two of the most striking aberrations have never been named. Lampa's varieties (*Ent. Tidskrift*, vi.) are not to be used here, as his *nebulata* (*dilutata*) has been ascertained to be the *autumnata* of Borkhausen (*addendaria*, B. White). The following is the best classification at which I have been able to arrive:—

I.—Grey forms, more or less typical:—

a. *dilutata*, Bkh.—Bands moderately distinct.

b. ab. *inscriptata*, Don.—Bands intensified.

c. ab. *impluviata*, Bkh.—Bands almost obliterated.

d. ab. *quadrijasciata*, Bkh., nec Tr.—Ground slightly paler, wings narrower, bands normal (? a superfluous name).

- e. ab. affiniata*, Bkh.—Ground slightly paler, weakly marked, costa more curved (? a superfluous name).
- f. ab. neglectata*, Weav.—Larger size, markings tolerably well pronounced.
- II.—Forms with darkened ground colour, = *ab. obscurata*, Stgr. :—
- g. ab. obscurata*, Stgr., *sec. fig. cit.* (Dup., viii., 205; Fr., 426, 4).—Bands or lines well discernible, though on darkened ground.
- h. ab. melana*, mihi, n. ab. = var. ♂ Haw.—Markings lost in the extremely darkened ground colour.
- i. ab. fimbriata*, Haw.—Ground colour slightly darkened ("fusco-cinereis"), anterior strigæ lacking.
- j. ab. ventilata*, Fb.—Ground colour slightly darkened ("obscure cinereis"), but with paler waved markings.
- k. ab. precursaria* (? Weav.), Gregs.—Ground colour more tinged with brown, markings of fore-wings weak (as in *C. boreata*).
- III.—Forms with whitish ground colour, ? = var. *autumnata*, Stgr., *Cat., pro parte, nec*. Bkh. :—
- l. ab. pallida*, mihi, n. ab.—Dirty white with distinct markings.
- m. ab. (? var.) christyi*, mihi, n. ab.—Pale grey or dirty white, glossy, weakly marked, central spot of fore-wings extremely small, second line angulated almost as in *O. autumnata*, Bkh., and *filigrammaria*, H.S.

NOTE.—The last-named aberration or variety (which I have called *ab. christyi*, in honour of Mr. W. M. Christy, of Emsworth, who has very kindly supplied me with specimens from Rannoch) seems inclined to form a local race in some places, and, indeed, at one time I spoke of it in my manuscript notes as "the birch subspecies"; the genitalia, however, agree with normal *dilutata*. Those eggs which I have seen are somewhat more highly polished, and of a more orange colour than the typical, but are liable to some variation. The form is almost exactly like Guenée's figure of his *autumnata* (= *autumnata*, Bkh., var. *guenéata*, mihi), and I should hardly have been able to convince myself that it was not *christyi* which Guenée had before him, but for his indications as to the larva (no reddish markings) and his specimens sent to Doubleday (a form of true *autumnata*, Bkh.). Even now I cannot help suspecting that Guenée may have confused *autumnata* var. *guenéata* and *dilutata* var. *christyi*, figuring the latter while describing the former. Placed side by side, however, *christyi* is (like all forms of *dilutata*) of a dirtier tone than *guenéata* as it stands in Doubleday's collection. I may add that Doubleday has some British examples of var. *christyi* in his collection, and has labelled them "*autumnata*?" Its larva, like that of typical *dilutata*, often has red markings.

IV.—Aberrations with respect to the central area. Two of these are very striking, but both hitherto unnamed :—

- n. ab. coarctata*, mihi, n. ab.—Central area narrow, the lines bounding it being closely approximated. This is figured by Erschov in *Horæ Soc. Ent. Ross.*, vi., pl. iii., fig. 4, and I possess one from Nottingham.
- o. ab. latifasciata*, mihi, n. ab.—Broad dark central fascia on paler ground colour. Mentioned by several authors, and figured by Mr. W. P. Blackburne-Maze in *Entom. Rec.*, vii., pl. ii.

A Classification of Butterflies by their Antennæ.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

(Concluded from p. 89.)

Dr. Jordan begins his survey of antennæ with the butterflies, where antennal evolution has made great progress in particular directions, and he has not apparently made many observations of the antennæ of the *Phalaenæ*, except amongst the larger forms, and then chiefly of the *Obtectæ*. He has thus been led into erroneous views as to the relations of hairs and scales on lepidopterous antennæ in the evolutionary series. He assumes that an antenna without scales is the primary form, and seems to consider that some trace of this form still appears in the not-scaled antennæ of sundry *Hepiali*. There is no doubt the not-scaled antenna is the primary form, but we must look

for it outside the Lepidoptera. The primary antenna within the order, is one with scales and hairs uniformly distributed over the whole antenna.

In *Micropteryx (calthella)* a very curious specialisation occurs that takes it out of the direct line of antennal evolution, but the distribution of hairs and scaling is still quite impartial as to ventral or dorsal arrangement of either. In *Eriocrania (purpurella)* the uniform distribution of hairs and scales over the whole antenna is unquestionable, and this is the primary type, from which the further development of antennal structures and their varied arrangement on the surface of the antenna as evolution proceeds, must be traced. The same arrangement is preserved, with little change, in the lower *Neolepidoptera*, Nepticulids, Cochlidiids, Lithocolletids (*Gracilaria*, &c.), so far at least as regards an universal clothing of scales to the antennae, and in most of these it is necessary to remove the scales in order to view the sense hairs. In *Cochlididae* the arrangements are most interesting, since, wherever pectination occurs, the underside of the pectinations have hairs only, but wherever there are no pectinations the scales are universal, with the hairs amongst and beneath the scales, perhaps a little more abundant ventrally. It might be difficult to say whether this totally scaled antenna is the result of the pectinations disappearing, or less probably because they have never appeared. It is worth noting that the pectinations occur by basal origin, and so the distribution of hairs is parallel to that in the long antennae of the Adelids.

Xponymenta presents an interesting and instructive stage in the passage to the ordinary form of Phalaenal antenna. Each joint of the antenna has two rings of scales, but the basal ring is wanting ventrally, and its place is occupied by hairs, which are here collected together. *Plutella*, *Swammerdamia*, and *Gelechia* are at much the same stage of specialisation.

The Hesperids, in preserving a very complete coating of scales, are only illustrating their relationship to the earliest Lepidoptera, and not as Dr. Jordan supposes, evidencing the highest development of scale-covering. Dr. Jordan points out several points of relationship to *Hepialidae*, as in the arrangement of the bristles, but has been misled by taking the Hepialid antenna as a primary, instead of a highly evolved, form. In some respects it is also a degenerate antenna, the irregularity of the segmentation into joints is evidence of this, though Bodine (*l.c.*, p. 28) regards it as evidence of evolution in progress. In this respect, however, it is exactly similar to the antenna of the *Talaeporidae (Psychidae)*, in the ♀s of which it is a constant feature in association with the gradual disappearance of the antennae with the other appendages. The scalelessness may be, probably is, another feature of the same degeneration, but it must be remembered that the Hepialids, though *Jugatae*, and so far to be regarded in comparison with any frenate form as more primitive, are, nevertheless, very high above the *Eriocraniids*, and, though on a different stem, very far above many *Neolepidoptera*, and, were the whole of once probably existing Jugate families still in evidence, it would probably not look at all improper to draw a parallel of the Hepialids amongst the *Jugatae*, with the Saturniids amongst Bombycids, or the Danaids amongst *Papilionidae* as evidence that the highest families tended to have scaleless antennae. Dr. Jordan mentions also an Arctiid, which would give an example at

the head of another phylum. In losing its scales, *Hepialus* retains some dorsal hairs which it probably had never lost. *Saturnia*, *Danais*, &c., have lost the dorsal hairs, and so the scaleless surface is naked, except where pits are partially regained by lateral encroachment. Dr. Jordan regards the scaleless dorsum of the last joints of many butterfly antennae as remains of the ancestral scaleless antenna. In view of the facts exhibited by the lower *Phalaenae*, this is by no means certainly the case. It appears to be rather a further evolutionary stage, resulting from a day-flying habit.

In several day-flying *Phalaenae*, the tendency to distal disappearance of scales is very strong. In *Agaristidae*, e.g., *Alypia octomaculata*, in such Noctuids as *Anarta*, or such Geometrids as *Psodos*, the dorsal scaling is reduced to a line of two, and finally of one, scale, and for several terminal joints there are no scales. Where, as in several instances, I have counted more than four or five such joints, I have suspected that the solitary remaining scale may have been removed by accident in some segments. Even assuming that it existed to the tip (and my whole observation, so far as regards absolute scalelessness, is due to such scales having been accidentally removed), the paucity and weakness of scaling towards the tip of the antennae in these forms, remains as a very strong and definite fact. Why other day-flyers such as *Syntomis*, *Nesta*, and *Anthrocera*, should not equally tend to have scaleless tips dorsally, is not very clear. *Hesperiidae* are in the same case, but some species evidence the commencing change, which has not perhaps had time to take effect in the Sesiids, and others. *Syntomis* and *Anthrocera*, are notable for a "booming" flight, i.e., as I take it, a straightforward and slow flight, uncomplicated by any rapid changes in pace or direction; whether this accords with the simpler scaling may be worth considering. *Polyphlocia ridens* with the last three-fourths of its antenna covered with sense-hairs, and yet certainly descended from moths with scaling dorsally to the tip, is perhaps an even stronger case. Nevertheless, Dr. Jordan's conclusion that Lycaenids originated at a very low point, possibly near *Jugatae*, is probably more correct than the reasoning by which he arrives at it. There is much reason to believe that *Lycaenidae* did not proceed from Hesperids, but from a common ancestor a little further back, in which the terminal antennal joints probably possessed dorsally both hairs and scales, as in *Eriocrania* (*purpurella*) and in lower *Neolepidoptera*. On Hesperids the hairs vanished, the scales persisted; in Lycaenids the scales disappeared and the hairs persisted. My point is that the ancestral Lycaenid had scales on the dorsal aspect of the terminal joints and, in fact, all over the ventral surface also, but I see nothing to prevent the hypothesis being held that the dorsal hairs have maintained their position right through, from the scaleless antenna of the non-lepidopterous ancestor, and have not necessarily migrated from below (the Hesperid position), supplanting scales. But if so, scales were certainly once associated with them.

In *Chimabacche* (*fagella*) the scaling is of ordinary obtect type. Under this name, Dr. Jordan correctly describes the scaling of the antennae of the long-horned *Adelidae*. It is unnecessary, however, to deal more fully with Phalaenal antennae, the main point* for the present is that in the early lepidopterous antenna both scales and hairs occurred on all its surfaces, and that their segregation was an after

specialisation. This may perhaps render it easier for either of them afterwards to encroach on and evict the other, if any advantage accrues from such a movement.

In the classification that Dr. Jordan arrives at, there is a large majority of items with which one agrees both on general grounds, and because the antennal structures described justify the conclusions. Some of these may be briefly noted. 1.—The ancestral position of the *Hesperiidae*, though not as Dr. Jordan concludes, specialised in the matter of scaling, and in this regard the highest of the butterflies. Dr. Jordan's strongest ground appears to be in the arrangement of the bristles. 2.—A similarly early origin for *Lycaenidae*, largely based on the bristles. Although the conclusions, founded on the absence of the dorsal scaling apically, cannot be accepted, there is much to be said on antennal and general grounds for deriving butterflies directly from the *Jugatae*, since their relationship to the earlier *Frenatae* is quite vague, and no families can with any certainty be referred to the intermediate line. It is certain that one must descend to the lower *Incompletæ*, if not to the *Jugatae*, to pass from butterflies to object *Phalaenæ*. 3.—The divergence of *Lycaenidae* on one side, and *Papilionidae* on the other, neither being very closely related, and certainly not derived from the other. 4.—The association of Erycinids with Lycaenids, and of Nymphalids with Papilionids, as very close in origin, if not actual derivations. 5.—The homogeneity of Nymphalids as evidenced by their tricarinate antennae, extending throughout the whole family, notwithstanding its great extent, and the possibility of dividing it into subfamilies, a homogeneity that does not exist in any other families except, perhaps, the Hesperids and Lycaenids.

The point on which it is necessary to part company with the author, is in his placing the Pierids with the Erycinids. This seems quite inadmissible on many grounds, and a close scrutiny of the antennal facts, shows that they do not by any means justify this conclusion, much less enable it to stand against the evidence to the contrary from other organs.

It is necessary in the first place to define a little clearly what is meant by such relationship. Dr. Jordan does not do so, but his argument occurs most frequently in accordance with the hypothesis that *Nymphalidae* are developed from *Papilionidae*, and that *Lycaenidae* give origin to *Erycinidae*, and these to *Pieridae*. There can be little doubt that this way of stating the matter suggests an erroneous view. I should say that *Nymphalidae* and *Papilionidae* had a common origin, the common ancestor being neither a *Papilio* nor a *Nymphalis*, but if one were bound to call it one or other, one would rather call it a *Papilio*, if for no other reason than that the pupa was no doubt supported by a girth. Similarly, *Lycaenidae* and *Erycinidae* had a common ancestor, which was neither Lycaenid nor Erycinid, but probably more Lycaenid of the two. The common ancestor of *Papilio* and *Lycaena*, unquestionably had Hesperid affinities. In rejecting, then, the derivation of Pierids from Erycinids, I do not assert that they were derived from Papilios, but that they were derived from the common ancestor of Papilionids and Nymphalids, and adhered for a time to the Nymphalids after the division from the Papilionids. Though Dr. Jordan's views as to the evolution of scales on the antennae tinge his whole argument, he does not specifically state that the scaling of *Pierinae* gives any

definite indication of their position in relation to *Papilionidae* and *Erycinidae*.

It is on the distribution of hairs and on the grooving which is more or less related to it, that the main portion of his argument rests. "Fine sense hairs specialised as in *Erycinidae*, but more highly so." "Configuration of ventral surface specialised, of the Erycinid type" (p. 413).

Now the plain meaning of these summaries, taken with the fuller argument, is that after the *Erycinidae* had existed for some time with the simpler antennae of Lycaenid type, which many of them still have [*e.g.*, "there is gradual transition from the not-grooved, to the grooved antenna" (p. 380)], the grooving then began, and somewhere here *Pieridae* branched off. Now there can be little doubt that if this were so, there would be some, probably many, forms in existence showing the transition. The double claw of *Pieridae* probably resulted from the impetus to tarsal development, resulting from the reacquirement of anterior tarsi in the males. I do not know that this suggestion is more improbable than the absence of the intermediate forms would be, were the derivation as postulated. If the *Pieridae* are related to the *Erycinidae*, then they originated together with them before *Erycinidae* had definitely grooved antennae, and the ancestral Erycino-Pierid had smooth antennae, was an Erycinid, in fact, with very nearly Lycaenid antennae. This is quite possible so far as antennae go, but not, from an antennal standpoint, more probable than that *Pieridae* originated from the early *Papilio* along with *Nymphalidae*.

If grooves originated in the Nymphalid stem, and also in the Erycinid, why should they not also arise in the Pierid? Three independent origins of grooving are not more unlikely than two. The Parnassiine groove must probably be added, making a fourth.

There was clearly a strong tendency in butterfly evolution, for the sense hairs to become restricted on the antennal surface, in favour of pits, and for hollows to be developed in which they lay. Dr. Jordan postulates that this tendency should take effect twice, in *Erycinidae* and *Papilionidae*, I ask the same, but I suggest that it took two or three different directions in the Papilionid stirps.

It seems to be possible to discriminate between the action of this tendency in the two branches. In *Erycinidae* the segregation of the hairs from the punctures is vague and imperfect, and has only a general relation to the grooving of the antenna. The grooving has attained a very definite development, whilst the hairs and punctures are still mixed together, both within and without the groove, though the hairs have begun in some degree to mass themselves in the groove. In the Papilionid stem there is no sign of a groove till the hairs have massed themselves, and after the grooves have formed, no hairs are to be found outside the grooves or amongst the punctures, even when these have invaded the groove.

When we come to the character of the groove, there is a great difference between Pierids and Erycinids, proving that, whether the families be or be not related, their antennal groovings had separate origins. The Erycinid groove begins as a flattening on the antennal club, which becomes deeper like a channel, running along the whole length of the club (except the tip) and, finally, so deep as to have definite, almost carinate margins. It is the same width at the margins

as at the middle of the segment. In some Erycinids there are patches of unscaled surface in the middle of the ventral surface of various segments of the shaft. Dr. Jordan describes these as grooves, but I cannot determine that they are hollowed in any way, beyond the depressed appearance due to the scales rising round them.

Now in *Pieridae*, the grooves begin as very definite circular or oval pits, on the middle of the ventral surface of the segments not extending to their extremities (*Aporia crataegi*, many *Delias*, *Kearsayi*, *Eucharis*, *Agostina*, and *Catasticta*), and this is more or less the case throughout the greater part of the *Pierinae*, only in some of the more evolved forms such as *Pieris alceste*, *Anthocharis belia*, do the grooves extend to the ends of the segments, forming a continuous groove along the antenna, but in such species there always remains a certain narrowing of the groove at the margins of the antennal segments, showing their development from a central point. Curiously enough, Dr. Jordan describes *Stalachtis* as belonging to this group. It certainly has a very straight groove, with margins quite parallel from end to end, in thorough Erycinid fashion. Its antennae, therefore, show it to be an Erycinid, as we always used to suppose it to be. Why Dr. Jordan calls it a Pierid remains unexplained, I can only imagine that Dr. Jordan, by some accident which escaped his notice, got his notes and figures of this genus inadvertently transferred from his Erycinid to the Pierid portfolio (figs. 25 and 27 are apparently transposed by some similar oversight). The restricted patch of hairs is always within the depression, no hairs occurring outside the groove as in Erycinids.

Dr. Jordan makes a very strong point of the fact that Papilionids show a decided tendency to restrict the hairs to two patches, and that the Papilionids are, therefore, a two-grooved family, and that consequently a one-grooved family like *Pieridae* cannot be derived from it. Though perhaps hardly consciously doing so, he here again assumes that if Pierids are close to Papilionids, it must be by derivation from an already well-characterised or even highly specialised Papilionid, instead of from an early form, now lost, that one would only call *Papilio*, because it is more *Papilio* than *Pieris*. This early form had already the tendency to restriction of the area of sense hairs, a tendency which was wanting in the Lycaenid branch, and which only appeared there in the Erycinid division after its separation from *Lycaena*, the Lycaenid and lower Erycinid being without grooves. In *Papilio* (archæan) also this was a tendency only, but it early took form, and did so in all the branches of the stem, resulting in *Papilionidae* merely in restriction, and that in the higher branches only, so that the Nymphalid grooving could not be derived from these. The Nymphalid grooving very early acquired great fixity.

The Parnassian branch showed depressions of a character not unlike those of *Pieris*, and quite unlike anything in the main Papilionid stem. I have not been able to satisfy myself that these depressions are not central but lateral, as Dr. Jordan believes he can demonstrate. The point is one of considerable interest, but of no importance as regards the phylogenetic question before us, as in any case no one, I think, has any idea that *Pieris* descends from *Parnassius*, but if it did, since it is difficult to see the unilateralness of *Parnassius*, the same unilateralness may quite conceivably underlie the Pierid form, though now impossible to detect. This much is certain, that the Pierine and

Parnassian grooving are interpretations of the primary tendency, much more like each other than are the Parnassian and Nymphalid, and so if the *Nymphalis* groove arises (as it certainly does) by descent from the same *Papilio* (archæan) as *Parnassius* does, then there is no difficulty in *Pieris* also doing so. The Parnassian groove is an oval (or irregular) depression, never (?) reaching the distal margin of the segment. There is another feature in the grooving in which *Pieris* follows the Papilio-Nymphalid tendency, rather than the Erycinid, and that is, that it is always well pronounced on the stalk, more so if anything, than on the club, whilst in Erycinids the grooving is always well developed on the club as compared with the stalk. It is also the case that the grooved aspect of the Erycinids is more internal, that of *Pieris* more ventral, when compared with each other.

The other structure which Dr. Jordan believes to attach the Pierids to the Erycinids, is the arrangement of the bristles; he expresses his conclusion to this effect strongly, but there is some weakness as to the facts. "Sense bristles, specialised as in certain Erycinids, sometimes obliterated. No connection with *Nymphalidae* and *Papilionidae*." It does not appear, however, that the Pierid type ever does occur in Erycinids. The Pierid type has two median lateral bristles and two apical ventral bristles. Now, in Erycinids, the median lateral bristles are a feature of the more specialised forms, but are unaccompanied by apical bristles, whilst apical bristles occur ventrally in the earlier forms without the median lateral ones. The earlier Erycinids and the earlier Papilionids are alike in preserving the Lycaenid (or Hesperid) bristles, an apical row. From this any other form may be derived—the Pierid as easily as the Nymphalid, or as the irregular patterns common in the higher Papilionids. The truth is, the sense bristles weigh very little either way, but if anything rather in favour of connecting *Pieris* with *Papilio*.

The primary arrangement of bristles is an apical row. There are three (at least) very definite specialisations, all with a median lateral pair of bristles. The Erycinid has no other, the Pierid has a ventral apical pair, the Nymphalid a ventral basal pair. None of these can be derived from each other, except the Erycinid from the other, but as its origin is obvious enough, this suggestion does not arise; all may be derived from Hesperid, Lycaenid, lower Erycinid, or lower Papilionid types.

The basal progress of the bristles is an evidence of higher evolution, the lower *Hesperidae* and *Lycaenidae* having a row of apical bristles, less fully apical in Lycaenids than in Hesperids and, therefore, commencing a basal specialisation. The lateral bristles are nearly alike, when at all specialised in Erycinids, Pierids, Papilionids, and Nymphalids.

In *Papilio*, the basal movement resulted in many various irregular arrangements, but nowhere did a pair reach the base as in Nymphalids. In Erycinids the bristles became nearly median, but seemed unable to get much out of a transverse row, so that the median and apical pair never occur together. In Pierids and Nymphalids the ability to get out of regular transverse alignment, seen in *Papilio*, resulted in an apical and median pair in *Pieris*, a median and basal pair in *Nymphalis*. The basal pair in *Nymphalis* is evidence of the highest attainable evolution of bristles in Rhopalocera.

The Dismorphiine antenna deserves a word of remark. It seems

very probable that their three-grooved antenna is directly derived from the one-grooved Pierine antenna, at a comparatively late period, and not a parallel development from a common ancestor, and it is no doubt true that the Dismorphiine neurulation has some Nymphalid features, suggesting a community of origin with the Nymphalids rather greater than in the Pierids generally, and, therefore, a derivation from the Pierid stem very shortly after it had left the Nymphalids. In *Leptidia sinapis* there is immense variety in the character of the grooving. The type is, no doubt, that described by Jordan, *viz.*, three grooves scooped out of the distal margin of the segment, the middle one being the larger; but their relative sizes may vary, their distances apart are not quite constant, there may be subsidiary depressed points (referred to by Dr. Jordan), and, in some cases, the median groove continues right to the base of the segment, reproducing very much the groove of *Anthocharis belia*. There is evidenced by this variability (as in *Parnassius*) either a forward struggle or a decay. It seems more probable that it is a struggle forwards—an attempt to obtain a rather larger area for hairs, to compensate the obvious diminution of their area due to the elongating tendency (seen in the wing nervures and antennae, characteristic of a majority, though not all, of the Dismorphiine group) driving all the sensory surface to the end of the club, and the hair patches to the distal margins of the segments. The restricted hair patches find it easier to burst out in fresh places than to increase their own area. They appear bisymmetrically on each antenna, and their variability I take to be evidence that the distribution we find here is recent, and if not still in progress is not yet stereotyped into constancy.

In *Pseudopieris*, which is much less specialised than *Leptidia*, the Dismorphiine grooves are not so definite. It may, perhaps, not have quite lost the impress of the Pierid antenna. In conclusion I wish to recognise the amount of admirably accurate work in Dr. Jordan's paper, and the great advance we obtain from it in the knowledge of the antennal structure of butterflies. My admiration is not lessened by the circumstance that I find Dr. Jordan short of facts as to the antennae of the lower *Phalaenae*, and consequently arriving at erroneous conclusions as to the lines of evolution of the lepidopterous antennae, and even as to the methods of antennal evolution. I am also obliged to disagree with him as to the position assigned to the *Pieridae*, not only on the evidence of structures I have myself more specially studied, or on that of so many other structures that have led authorities to place *Pieris* anywhere but where Dr. Jordan places it, but on the evidence of antennal structure, the most reasonable interpretation of which places them as derivations of the Papilionid, and not of the Lycaenid, phylum.

Sale of the Stanton Library.

One is uncertain whether an unsatisfactory method of advertisement, by which possibly very few entomologists knew that the sale of the "Stanton library" was taking place, or whether the general want of interest in entomological works, was responsible for the fact that the number of private buyers at Sotheby's, on April 19th, might have been counted on the fingers of one hand, and that about one half of

the lots fell to Quaritch, one of the best known dealers. Our own experience at Stevens', some two years ago (when a complete set of Oechsenheimer and Treitschke's *Schmetterlinge von Europa* would have sold to a dealer for 8s., and Guenée's *Histoire Naturelle*, for 10s., but for our joining the bidding at the last moment, and failing to buy against the dealer at £4 10s. and £3 respectively), suggests that there must be a private buying public (or the dealers would not give the high prices they do when there is opposition) that has not sufficient knowledge of the books dealing with our own subject to risk the purchase of desiderata in the sale rooms, but that will buy from a private list if the values can be discussed with a friend beforehand, and the purchase made at leisure. On the other hand some books are so generally well known that they will always fetch an average price, e.g., Millière's *Iconographie*, &c., which went for £10 5s., and rarely goes above £11 or under £10. Some of the prices strike one as absurdly low, others as about a fair market value. The following (mostly in half-calf) will tell their own tale:—*Ann. de la Société Entom. de France*, 1832-1892, 60 vols., £35; *Ann. de la Société Entom. de Belge*, 1857-1892, 34 vols., £6 10s.; *Berl. Entom. Zeitschrift* and *Deutsch. Entom. Zeitschrift*, 1857-1887, 30 vols., £4 4s.; Buckler's *Larvæ of the British Butterflies and Moths*, vols. i.-iv., £2 11s., other sets went for £2 17s., £2 19s., £2 19s.; *Bulletino della Società Entomologica Italiana*, 1869-1893, £6 5s.; Buckton, *Monograph of the British Aphides*, £2 12s.; Cameron, *Monograph of the British Phytophagous Hymenoptera*, 4 vols., £2 11s.; *Canadian Entomologist*, 1869-1892, £5; Curtis, *British Entomology*, £11 5s.; Donovan, *Natural History of British Insects*, £4 2s. 6d.; *Entomological Magazine*, 5 vols., £1 16s.; *Transactions of the Ent. Soc. of London*, 1836-1892, £33; *Proceedings Entomological Society of Philadelphia*, vols. i.-vi., £4; *The Entomologist*, vols. i.-xxv., £4 7s. 6d.; *Entomologist's Monthly Magazine*, 28 vols., £3 12s. 6d.; *Entomologist's Weekly Intelligence*, 10 vols., 14s.; *Stettin. Entomologische Zeitung*, 48 vols., £5; Fabricius, *Entom. Systematica*, 5 vols., *Species Insectorum*, 2 vols., *Mantissa Insectorum*, 2 vols., and other books, £1 16s.; Guenée, *Histoire Naturelle*, &c., 7 vols., 14s. (this appears an absurd price for this useful work); Heinemann, *Die Schmett. Deutschlands*, &c., 2 vols., 1859-1877, £1 8s.; *Horæ Soc. Ent. Rossicæ*, 1861-1895, £17 5s.; Latreille, *Histoire Nat. des Crust. et des Insectes*, 14 vols., *Genera Crust. et Insectorum*, 4 vols., £1 12s.; *Linnaea Entomologica*, 16 vols., 20s. (this price is quite ununderstandable); McLachlan, *Monographic Revision and Synopsis of the Trichoptera of Europe*, £2; *The Entomologist*, vol. i., and Bate and Westwood, *British Sessile-eyed Crustacea*, £1 12s.; Panzer, *Insecta Germanica*, 36 vols., 14s.; Rambur, *Catalogue Sys. des Lép. de l'Andalousie*, £1 4s.; Schrank, *Fauna Boica*, 3 vols., Germar, *Coleopterum Species*, 16s.; Snellen, *De Vlinders van Nederland*, Microlep., 2 vols., 15s.; Stainton, *Nat. History of the Tineina*, 13 vols., £3 8s.; Stephens, *Illustrations of Brit. Entomology*, 11 vols., £1 8s.; *Tijdschrift voor Entomologie*, &c., 34 vols., £11 15s.; *Wiener Entomologische Zeitung*, 9 vols., £3 10s.; *The Zoological Record*, 28 vols., £7 15s.; *The Zoologist*, 45 vols., £3 5s.; Albin, *Natural History of British Insects*, also *Natural History of Spiders*, 18s.; Ernst and Engrmelle, *Papillons d'Europe*, &c., 8 vols., £5; Fuessly and others, *Archives de l'Histoire des Insectes*, 1794, *Verzeichniss der ihm bek. Schweiz Insekten*, 1775, *Histoire Abrégée des Insectes de Paris*, 1762, *Sys. Verz. der*

Schmett. der Wienergegend, 1776 (2 copies), with 3 other books, 5s.; De Geer, *Memoires*, &c., 9 vols., £10 15s.; Gray, *Monograph of the genus Phasma* (2 copies), £2 5s.; Herrich-Schäffer, *System. Bearbeitung der Schmett. von Europa*, 1843-1856, £27 10s.; Hewitson, *Exotic Butterflies*, pts. 1-29, 63-100, £3 3s.; Hübner, *Sammlung Europäischer Schmetterlinge*, 5 vols. (no text), £24; Hübner, *Geschichte Eur. Schmetterlinge*, 3 vols. (no text), £5 10s.; Kirby, *Fauna Boreali-Americana*, pt. 4, £4 7s. 6d.; Lewin, *Nat. Hist. of the Lepidop. Insects of New South Wales*, £3; Westwood and Humphreys, *British Moths and their Transformations*, 2 vols., £3; Zetterstedt, *Insecta Lapponica*, 3s.; Blackwall, *History of the Spiders of Great Britain and Ireland*, £3 10s. &c. These are a fair sample of the better known books, and the prices quoted will strike those who know, as being remarkably irregular, and, from the seller's point of view, unsatisfactory. One feels one would like to know what some of the better books would have fetched with spirited opposition, for to suppose that many reached a moiety of their true market value is absurd.

ORTHOPTERA.

EXOTIC CONOCEPHALIDÆ IN ENGLAND.—From time to time, various species of exotic *Conocephalidæ* have been taken in this country, chiefly in hothouses. In several cases the specimens have been kept alive, and fed on flies and spiders. In 1869, Butler noted at the Entomological Society of London, that a number of *Conocephalus* joined a ship off the west coast of Africa. They were green at the time, but soon changed to brown. Many died on the voyage, but several actually reached the Thames alive. These may very well have been captured in the neighbourhood, and recorded as "locusts." At a meeting of the Society in 1882, Mr. Jenner Weir exhibited some examples which he considered to be *Conocephalus ensiger*, Harris, an American species. He had received them from J. Veitch and Sons, of Fulham Road, with a note to the effect that they were numerous in their hothouses. They had been kept for some weeks in captivity, feeding readily on flies and spiders. In the following year Mr. Billups recorded a *Conocephalus* (?) that had been taken in a greenhouse at Lee. It had lived in captivity for ten days on a diet of spiders, flies and meat. It seemed to prefer the common housefly. Shortly afterwards a similar one was taken, which was considered to be *Copiophora cornuta*, de G. In 1885, Mr. McLachlan exhibited, at a meeting of the Entomological Society, a specimen of *Copiophora cornuta* (?) taken in a hothouse at Birmingham. Mr. Eland Shaw mentioned that M. de Saussure had seen the specimens, without recognising them, but that he considered them to have come from Australia, though the captors thought that they had been imported from America. The specimen recently recorded from Kew Gardens by Mr. Lucas was certainly an American species. The *Conocephalidæ* are a large and widely-distributed family of *Locustodea*, monographed by Redtenbacher. *Conocephalus mandibularis*, Charp., occurs practically throughout the Old World, except Australia. It is quite common in southern Europe, but does not occur so far north as England. Of this genus alone there are about seventy species known. Another large genus *Xiphidium*, Latr., is also widely distributed. *X. fuscum*, Charp., is common in central and southern Europe, and is

erroneously said to have been taken in England. *X. dorsale*, Latr., which is somewhat rarer in Europe, is our only representative of the family, and is a very local species. So far as I know, it only occurs in a few marshy places in the southern counties. In Europe it is commonest in the north of Germany, and in the marshes of Denmark. A peculiar species that is found in south-eastern Europe, *X. hastatum*, Charp., has an ovipositor nearly double the length of the body.—M. BURR, F.Z.S., F.E.S., Bellagio, East Grinstead.

ACRIDUM AEGYPTIUM, L., AT COVENT GARDEN.—I have received for determination, from Mr. Charles Whitehead, of Barming House, Maidstone, a living female of this locust, taken in cauliflowers in a house in London. The vegetables had come from Covent Garden, and had been originally imported from Italy, where this species is common, though it appears to do no damage.—IBID.

PRACTICAL HINTS.

Field Work for Spring Months: May—June.

By J. W. TUTT, F.E.S.

1.—During May it pays to search willow bushes, not beat them, for larvæ of *Epinoda viminalis*, *Tethea retusa*, and *Clostera reclusa*. The larva of *Tethea retusa* prefers willows with leaves of thin texture; it is also found on willows.

2.—About the middle of May search hawthorn for larvæ of *Scotosia reticulata* and *S. rhamnata*. The rolled-up leaves should first be picked off for those of *S. reticulata*, and then you must beat for those of *S. rhamnata*.

3.—“The larva of *O. rhododactylus* feeds in late May, just beneath the leaf overlapping the rosebud, eating into the bud from the side, also in similar positions at the ends of the young rose-shoots” (Porritt).

4.—From tufts of *Salix repens*, on the Culbin sands, on May 24th, I dug out 156 larvæ of *Agrotis praecox* and several of *A. vestigiatis* (Norman).

5.—Towards the end of May the larvæ of *Eupithecia pumilata* may be beaten from furze blossoms.

6.—The imagines of *Stigmonota weirana* fly in the sunshine around the tips of the branches of beech trees in May and June.

7.—In early June the larvæ of *Dyschorista fissipuncta* are very abundant under the loose bark of old pollard willows.

8.—The flowers of hawthorn are very attractive to *Pyrodes rhediana* at the end of May or early in June.

9.—In May the flowers of maple (*Acer campestre*) should be beaten for larvæ of *Eupithecia subciliata*.

10.—Willow catkins collected in May will give sometimes a plentiful supply of the larvæ of *Eupithecia tenuiata*.

11.—The larva of *Phloxopteryx siculana* is to be found on *Rhamnus frangula* in May, the imago flies at dusk, in late July and August, over the herbage where its food-plant grows.

12.—The imagines of *Phibalapteryx ritalbata* are on the wing in May, flying rapidly along hedges where clematis grows, at dusk. A second brood flies similarly in August. Larvæ may be beaten in late June and July.

13.—The larvæ of *Paedisca occultana* may be found feeding on the

young larch shoots in May, and the imagines may be obtained flying at dusk around the tops of small larch trees in early July. The larvæ form silken galleries along the shoots; they also feed on Scotch fir.

14.—The larvæ of *Leucania straminea* may sometimes be found in abundance in late May and June feeding by night on the tops of the reeds (*Arundo phragmites*) in ditches, &c.

15.—Towards the end of May and in early June the imagines of *Phoxopteryx upupana* fly high above the birches in the afternoon sunshine. It requires a long-handled net to capture them readily.

16.—The junipers should be beaten in May and June for the larvæ of *Thera simulata*. The imagines are to be taken on the junipers at night in July and August.

17.—In May and June the young shoots of stone pine (*Pinus*) should be collected for larvæ of *Retinia sylvestrana*.

18.—At the end of May and June, in any locality where *Acidalia subsericeata* is known to occur, work well the herbage around the roots of dwarf bushes, low down near the ground; the insect nearly always hides in such places during the day.

19.—*Stigmmonota nitidana* flies high up around the projecting twigs of oak trees in late May and June. Stand beneath the outer branches of an oak, and with a long net large numbers may be taken in the afternoon and until sundown.

20.—The larva of *Taeniocampa populeti* feeds upon aspen, residing between two leaves united by a web. It is very transparent, and always colourless, a sort of yellowish-white, with a black head. Often high up on tall trees.

21.—Beat (or search) aspen the first week in June for larvæ of *Brepfos notha*; the full-fed larva wants cork or rotten wood in which to make its cocoon.

22.—“I have to record the capture, by myself and two friends, of over three hundred larvæ of *Xylophasia scolopacina* in woods, at Hampstead and Highgate, between the 1st and 3rd of June” (Lockyer).

23.—The larva of *Eugonia polychloros* should be searched for in June, feeding gregariously, rather high, on elm, willow, &c.

24.—An overhanging bank, a hole where a tree has been blown down, the edges of a quarry or chalkpit, a landslip, banks on sandhills, banks in lanes where the soil or gravel has fallen away, should be first searched carefully for lepidoptera, then gently scraped with a stick to disturb those overlooked (Gregson).

25.—The larvæ of *Simaethis pariana* should be searched for in June on hawthorn and apple, on which plants it feeds, spinning a silken web on the surface of a leaf, under which it lives.

26.—In June collect the bunches of oak leaves that are spun together high up on the oak trees for larvæ of *Rhodophaea tumidella*. The bunches low down on the small bushes contain larvæ of *R. consociella*.

27.—One of the most successful food-plants on which to rear *Poecilocampa populi* is alder. The larvæ thrive excellently on it (Bowles).

N.B.—For similar series of “Practical Hints” for this time of the year, see vol. x., pp. 133-135; vol. ix., pp. 95-96; pp. 120-121; vol. viii., pp. 20-21; pp. 43-44; vol. i., p. 47, &c.

NOTES ON COLLECTING, Etc.

TILIACEA AURAGO IN DEVONSHIRE.—On October 17th, 1893, I took one specimen of *T. aurago* here at light, and another on October 13th, 1895, but did not sugar until 1896. Between September 28th and October 19th, 1896, I took over 30 at sugar but none at light; in 1897, from September 20th to October 9th, I captured 15 at sugar, and 21 at light. In 1898, none were taken at sugar and only one at light, on October 15th. I may add that in 1896, 1897, and 1898, light and sugar were kept going every night whilst there was any possibility of an imago being out.—E. F. C. STUDD, M.A., Oxtou, Exeter.

LEPIDOPTERA NEAR SOUTHEND IN 1898.—The following notes on the lepidoptera taken in this district during the past season (1898) may prove interesting to some of your readers. *Hybernia rupicaprararia* was abundant on January 22nd, as much so as *Cheimatobia brumata* had been in the previous November. A specimen of *Biston hirtaria* occurred on a fence in Southend, on April 22nd, *Depressaria purpurea* on April 23rd, and a quite fresh specimen on September 18th, both in Southend; April 29th, *Lithocolletis carpinicolella*, bred from hornbeam, gathered at Eastwood in the autumn; *Phloeodes immundana*, *Coccyx argyrana*, *Eupithecia abbreviata* on tree trunks, and cases of *Coleophora ibipennella*, on birch at Eastwood, on the 30th; a specimen of *Lithocolletis tenella*, on a hornbeam leaf at Eastwood, May 11th; on the 14th, *Adela viridella*, *Nemophora swammerdamella* and *Asycha modestella*; on the 15th, larvæ of *Agdistis bennettii* were not uncommon on sea-lavender, at Canvey; on the 21st, *Cnephasia musculana* emerged, and *Harpipteryx nemorella* was netted at Prittlewell; on the 22nd thousands of cocoons of *Cemistoma spartifoliella* were observed and *Lithocolletis emberizaepennella* was netted at Eastwood; *Ligdia adustata* was not uncommon at Prittlewell on the 27th; *Bapta temerata* and *Phoropteryx diminutana*, *Gelechia scalella*, and *Grapholitha obtusana*, on the 30th; on the same day a specimen of *Taeniocampa gothica*, in very fair condition, on a fence in Southend; on June 10th, the first of a series of *Argyresthia pygmaella* emerged from willow, gathered at Eastwood in April; on the 5th *Panagra petrararia*, *Cidaria corylata*, *Eupoecilia dubitana*, *Roxana arcuana*, *Dicrorampha acuminatana*, *Coleophora panzerella* and *Eupithecia plumbeolata* occurred at Eastwood; on the 10th *Tinea fuscipunctella* in the house, and a nice specimen of *Nepticula subbimaculella* in a flower-pot which contained scabious, gathered close to oak, at Hadleigh, in the autumn; *Teleia scriptella*, netted at Eastwood; on the 11th, *Tischeria complanella* and cases of *Coleophora palliatella*, at Eastwood; on the 16th, cases of *Taleporia pseudobombycella*, on oak trunks at Hockley, and *Sevicoris urticana*, *Lampronia luzella*, *L. praelatella*, and *Teleia notatella* netted; the first of a short series of *Eupithecia tenuiata*, bred from willow catkins gathered in April, at Eastwood; on the 19th, *Stimonota rosetticolana*, *Grapholitha geminana*, *Phoropteryx lactana*, *Paedisca bilunana*, *Ptycholoma lechana*, *Acidalia trigeminata* and *Nisoniades tages*, at Eastwood; on the 20th, *Depressaria assimilella*, emerged from larvæ found between twigs of broom, at Eastwood; on the 21st, *Noctua festiva* at sugar. I was quite glad to see a solitary specimen of this generally common insect, so few had been the visitors at the sugar during the month of June. *Larerna ochraceella* occurred on the 27th, among *Epilobium* near Eastwood, and *Orthotaenia*

branderiana and *Coleophora riminella* were bred—the former from larvæ found in rolled leaves of aspen, the latter from cases on saw, at Eastwood; on July 2nd, *Leucania impudens* occurred at sugar, Shobury; on the 3rd, at Eastwood, *Nemophila russula*, *Lithosia mesomella*, *Botys lancealis*, *Argyresthia retinella*, *Melanippe hastata*, and numbers of larvæ of *Pygaera pigra* between united aspen leaves; on the 4th, *Grapholitha nisella* emerged from saw catkins gathered at Eastwood; on the 6th, *Hepialus hectus*, *Phorodesma pustulata*, *Tortrix sorbiana*, *Dictyopteryx loeflingiana*, and *Leioptilus tephradactylus*, occurred at Eastwood; on the 10th, *Melanippe rivata*, *Calligenia miniata*, *Sciaphila chrysanthæana*, *Eupithecia castigata*, *Argyrolepis enicæna*, *Penthina betuletana*, *Coleophora palliatella*, *Argyresthia brockella*, *Tischeria complanella*, *Stymonota nitidana*, *Glyptopteryx equitella*; on the 16th, *Depressaria flavella* emerged—larva obtained at Hockley; on the 17th, *Timandra amatoria*, *Zanclognatha tarsipennalis*, *Rhodophaea tumidella*, and *Argyrotoxa curvayana*, occurred at Eastwood; on the 18th, a specimen of *Plutella porrectella*, found in the house; on the 30th, *Chrysocoris festaliella*, on bramble bloom, and *Melanthia albicollata*, at Eastwood; *Pseudoterpna pruinata*, on the 31st; *Nemotois cupriacellus* on ragwort, August 1st; on the 2nd, *Coleophora conspicuella* and *Parasia lappella* among *Centaurea nigra*, at Benfleet; *Hyponodes costastriatalis*, at Eastwood, on the 3rd; and on the 4th, *Phoropteryx siculana* bred from a pupa found July 30th enveloped in a white web in the fork of a blackthorn, at Eastwood; on the 5th a short series of *Gelechia mulinella*, bred from broom flowers gathered at Eastwood; on the 14th (*Ecophora unitella*, *Hyponomeuta plumbella*, near Pritttlewell; on the 19th, *Conchylis smeathmanniana*, flying among knotgrass and sorrel on some waste ground in Southend; on the 23rd, *Triphaena ianthina* and *Eupione apiraria*, near Pritttlewell; larvæ of *Eupithecia linariata* on toadflax near Southend, on the 20th; on the 4th September, *Cidaria testata*, at Eastwood; on the 18th, *Hypona rostralis*, at sugar, near Southend; at Hockley, on the 25th, larvæ of *Demas coryli* and *Hylophila prasinana*; on the 2nd October, *Ithacodia caudana* and a larva of *Phorodesma pustulata*, at Eastwood; *Calocampa retusta*, on the 12th, at sugar, Southend; and *Depressaria costosa*, bred from broom, 6th November. There are one or two local insects in the above list not hitherto recorded for this district. I wish I could include a few good Noctuid species, but I found 1898, as most of your correspondents appear to have found it, anything but a good year for records at sugar.—F. G. WHITTLE, 3, Marine Avenue, Southend.

BREPHOS NOTHA NEAR IPSWICH.—I saw *Brephos notha*, near Ipswich, on April 17th, although it appeared to be much rarer than in 1894, when I first saw great numbers flying round the willows towards the end of March.—CLAUDE MORLEY, F.E.S., The Crescent, Ipswich.

COLEOPTERA.

On the British Species of the Genus *Olibrus*, Er.

By E. A. NEWBERY.

This little genus has been somewhat neglected by British coleopterists. In Fowler's work both *O. affinis*, Sturm., and *helveticus*, Rye

(=*flavicornis*, Sturm.), are scarcely defined at all. As it is extremely probable that there are other British species yet to be discovered, I append a table of those at present known, founded principally on the alutaceous punctuation of elytra, which appears to me to be more reliable than colour. The colour of some of the species is very variable, and I have made one or two remarks on this and some other matters. I have also added a few localities not, I think, hitherto published. The whole of the species are found on the flowers of *Umbelliferae* and *Compositae* :—

A.—Elytra almost entirely alutaceous.

I.—Elytra greenish or blackish bronze, underside and club of antennae dark.

a. Form longer, plainly narrowed behind—*O. aeneus*, F.

b. Form shorter and more convex, nearly regularly elliptical—*O. millefolii*, Pk.

II.—Elytra brown, paler towards apex, antennae and underside pale red-yellow.

* Suture and outer margin of elytra darker than disc—*O. corticalis*, Pz.

** Suture and outer margin not darker than disc—*O. liquidus*, Er.

B.—Elytra not alutaceous, except sometimes at extreme apex.

I.—Size moderate (l. 1.5 mm.—2.7 mm.).

a. Elytra entirely black, average size larger—*O. flavicornis*, Sturm. (*helveticus*, Rye?).

b. Elytra with at least traces of a brown spot at apex.

* Form shorter and less narrowed behind. Insect more shiny—*O. particeps*, Sturm.

** Form longer and more narrowed behind. Insect less shiny, striae more apparent—*O. affinis*, Sturm.

II.—Size very small (1 mm.), thorax and elytra entirely black—*O. pygmaeus*, Sturm.

O. aeneus, F.—This common insect is often black-bronze, without any trace of the usual greenish lustre. The apex of elytra is rarely infusate.

O. millefolii, Pk.—This can only be mistaken for the black form of *aeneus*, from which its shape at once distinguishes it. It does not appear to be common, I have only taken it at Shirley (Hants), and have seen but few specimens.

O. corticalis, Pz.—Paler in colour than any of its congeners, with suture and margins of elytra blackish. It is a local insect. Chilworth and Shirley (Hants), Shiere (Surrey).

O. liquidus, Er.—Similar to the last but much darker in colour, with suture and margins not conspicuously darker, alutaceous punctuation of elytra often ceasing at a little distance from base. More widely distributed than *corticalis*. Lyndhurst, Southampton, Shirley, Hayling Island, Gosport (Hants), Shiere (Surrey).

O. flavicornis, Sturm.—Described by Sturm as a var. of *bicolor*, but appears to be a good species. About the size of *liquidus*, or even larger. Elytra entirely black. Formerly rested as British on Mr. Champion's unique example. I took a couple of specimens at Dover in August, 1896, on the chalk downs near the convict prison, and recorded them as *particeps* in error (*F.M.M.*, 1897, p. 18). It has since been taken by Mr. Elliman, in some numbers, in moss, at Chesham (Bucks.).

O. particeps, Sturm.—This species is very closely allied to *affinis*, their separation being a matter of great difficulty. Much confusion has been caused by foreign authors having placed it among the species

with entirely black elytra. The elytra are rarely, if ever, entirely black, as far as my observation goes, and I have seen a large number of examples. In a good light a gradual approach to brown is always perceptible at apex. *O. particeps* has been taken in some numbers by my friend Mr. J. H. Keys, of Plymouth, in several places near Whitsand Bay, and Mr. Elliman has also taken the species at Chesham.

O. affinis, Sturm.—In addition to its longer form and less metallic appearance as compared with *O. particeps*, *O. affinis* appears to be usually of a paler colour. I have a specimen from Hythe (Hants) which I have no doubt is *O. affinis*: another from Lyndhurst is less characteristic. Mr. Champion has, I believe, also taken the insect in the New Forest.

O. pygmaeus, Sturm.—The small size of this insect will at once distinguish it from any other British *Olibrus*. According to some authorities the elytra are alutaceous, but I have never seen this in any specimen I have examined. Mr. Claude Morley has recently taken it in some numbers at Brandon (Suffolk).

In some of the foreign tables the sutural striæ are said to be abbreviated in *O. flavicornis*, and to reach base in *O. particeps* and *O. affinis*. I have satisfied myself that this character is of little, if any, use. The males of all the species have the second joint of the anterior tarsi more or less dilated.

Notes on the additions to the British List of Coleoptera since Canon Fowler's "Coleoptera of the British Isles."

By HORACE DONISTHORPE, F.Z.S., F.E.S.

In the *Entomologist's Monthly Magazine*, vol. xxxiii., p. 145, Mr. Champion gave a very useful list of the additions to the British coleopterous fauna since the 1893 Catalogue by Dr. Sharp and Canon Fowler. It occurred to me, however, that a list since Canon Fowler's *Coleoptera of the British Isles* would be of great service to coleopterists, as some of the additions in the 1893 Catalogue appear there for the first time, and in other cases very little has been written, or is known, about them. *The Coleoptera of the British Isles* is our standard work at present, and all coleopterists are conversant with its contents, but many use Dr. Sharp's *Catalogue* (2nd edition, 1893), and are, therefore, unacquainted with all the additions in the 1893 Catalogue. There are also several omissions in it which should not occur, and which I have taken the liberty to point out. I have used the term "aberration" in the Staudingerian sense, as a form that occurs more or less frequently with the type, restricting the term "variety" to a local race, again following Staudinger, and the general practice of the leading British and Continental authorities. I have arranged my list in generic order, as follows:—

Carabus cancellatus, Ill.—This unfortunate species has been continually knocked out of, and reinstated into, our catalogues for years. I propose to give such evidence as there is for and against it, without expressing an opinion as to whether it should stand or not. (1) *Catalogues*.—It was regarded as a good species in Mr. Waterhouse's *Catalogue* (1861), in Rye's (1866), and in Fowler and Matthews' (1883). In Crotch's *Catalogue* (1863) as "reputed British," and in his 2nd edition (1866) as a doubtful species. It is not mentioned in Sharp's 1st (1871) or 2nd edition (1883), or in Sharp and Fowler (1893).

Stephens, in his *Manual*, 1839, p. 15, says:—"Very rare, taken in a chalk-pit at Northfleet, April." Fowler writes in the *Ent. Mo. Mag.*, vol. xix., p. 122, under "Notes on New British Species since 1871":—"This species has been alternately inserted in and omitted from the list. Dr. Power tells me that there are certainly two or three well authenticated specimens, and that he thinks one has been taken within the last two or three years; among some notes from Mr. Mason, relating to Mr. Rye's collection, I find this insect mentioned as one that ought to be reinstated," and in his book (*Col. Brit. Isles*, vol. i., p. 99) he writes:—"Although recorded as British it is a very doubtful species, and requires further confirmation." Mr. H. J. Cuthbert records having captured a specimen at Pouladar, West Cork (*Ent. Mo. Mag.*, xxi., p. 266, 1895). It has been reinstated on the strength of this capture.

Carabus nitens ab. *niger*, Semenow.—Donisthorpe, *Ent. Record*, vol. xi., p. 71:—"One specimen taken by myself in Denny Bog, New Forest, in 1895.

Harpalus froelichi, Sturm.—Newbery writes (*Ent. Mo. Mag.*, vol. xxxiv., p. 84):—"Taken in some numbers by Mr. C. Morley and Mr. Ellis, under stones, at Foxhall, near Ipswich, 1898."

Harpalus azureus ab. *similis*, Dj.—This aberration is omitted in the 1893 Catalogue. It is included in all the others with the exception of Mr. Rye's 1866. Fowler says (*Col. Brit. Isles*, vol. i., p. 45):—"The var. *similis*, Dj., is pitchy, with slight metallic reflection on the elytra, and has the interstices of the elytra more strongly punctured, it occurs sparingly with the type." I have taken it at Abbotsbury, in Dorsetshire, with the type. It certainly should not be left out.

(To be continued.)

CURRENT NOTES.

We have recently received from Mr. G. C. Bignell, a pamphlet of 48 pages on "The Ichneumonidae of the South of Devon." It comprises a short, but very interesting general account of the parasitic Hymenoptera, and a catalogue of the parasitic Hymenoptera bred or captured principally in south Devon. The paper represents a vast amount of labour, spread over very many years, and reflects the greatest credit on the industry and observation of the veteran author. We have only one regret, and that is, that the year has not been added to the date on which the insects have been bred, so as to be readily available for future reference.

The fourth annual Congress of the South-Eastern Union of Scientific Societies will be held at the Mathematical School, Rochester, on May 25th, 26th, and 27th, 1899. Mr. J. J. Walker, F.L.S., F.E.S., is among those who are reading papers, and various excursions are being arranged for the afternoon of the 27th. Tickets for the Congress are 2s. 6d. for members of affiliated societies, and 3s. 6d. for non-members. The beautiful district around Rochester is worthy of a visit, and if entomologists can obtain a guide to the Queendown Warren, a few miles out of Chatham, a new and delightful bit of country will be opened up to them. Almost equally good are many of the nearer localities, the whole being classic ground to the entomologist, thanks to the researches of Messrs. Chaney, Lewcock, Walker,

Tutt, and others. The local secretary is Mr. J. Hepworth, Linden House, Rochester.

We would call attention to the *List of the Coleoptera of the Rochester District*, by Mr. J. J. Walker, which is now in course of publication in the *Rochester Naturalist*. It is most carefully annotated, and possibly no local list of coleoptera yet published in Britain will compare with it in excellence and completeness. As the *Rochester Naturalist* is only 1s. per annum, every coleopterist ought to write to Mr. W. T. Wildish, St. Margaret Bank, Rochester, and obtain the numbers for 1898 and 1899, which contain the *List*.

At the meeting of the Entomological Society of London, on April 5th, Mr. Blandford gave an account of a paper by Dr. A. Ribaga, published in the *Rivista di Patologia Vegetale*, v., p. 343, on an asymmetrical structure occurring in the adult female of the common bed-bug, and apparently hitherto overlooked, although it communicated with the exterior by a conspicuous notch in the fourth abdominal segment, midway between the median line and the lateral margin. This structure consisted of a large quasi-glandular mass of unknown nature in which was encapsuled an organ consisting of fibres, the free ends of which terminated in minute chitinous spines in a recess lying under the fourth abdominal segment. The adjacent margin of the fifth segment was thickened and set with strong teeth. The non-glandular part of this singular structure was conjectured by its discoverer to be a stridulating organ; but no evidence of stridulation had been obtained. It was certainly far more complex than most, if not all, other stridulating organs known to exist in insects.

At the same meeting Mr. Blandford read some notes by Dr. Bennett on the habits of the Goliath beetles. In reply to the remarks which followed, Dr. Bennett stated that the male beetles use their cephalic horns in fighting with one another, as well as for puncturing the bark of vines in order to bring about a flow of the sap, upon which they feed.

In many of the schedules we sent out to our correspondents for data referring to the British species of Psychids, Pterophorids, Lasio-campids, Endromids, Saturniids, Sphingids, &c., we notice, on their return that the data relating to the genera *Psyche*, *Solenobia*, *Taleporia*, *Xysmatodoma*, *Diplodoma*, and *Teichobia* (*Psychoides*), are confined to about eight counties, and these to one or two places in each county (except Essex and Kent, which appear to have been better worked than any other counties). Can none of our readers make up a county list from available records, of these and the Pterophorids? If so we should be extremely obliged; single records, too, would be of the greatest value. We have not more than two or three records for either Scotland or Ireland for the Psychid genera mentioned above. As our MS. for this superfamily is practically complete, except for details of distribution, we should be glad of every scrap of information available. We would also appeal to each of our readers for a local list of the species comprised in the above-mentioned families, and for a list of dates of appearances for the current year.

Dr. Krauss (*Zool. Anzeig.*, p. 583, March, 1899) asks—What is *Condylopalama agilis*, Sund.? That is the question that entomologists have asked themselves ever since Sundevall described the creature in 1847, and none have answered it. Ever since then it has been placed at the end of the earwigs, as a "*species incertae sedis*." Sharp having

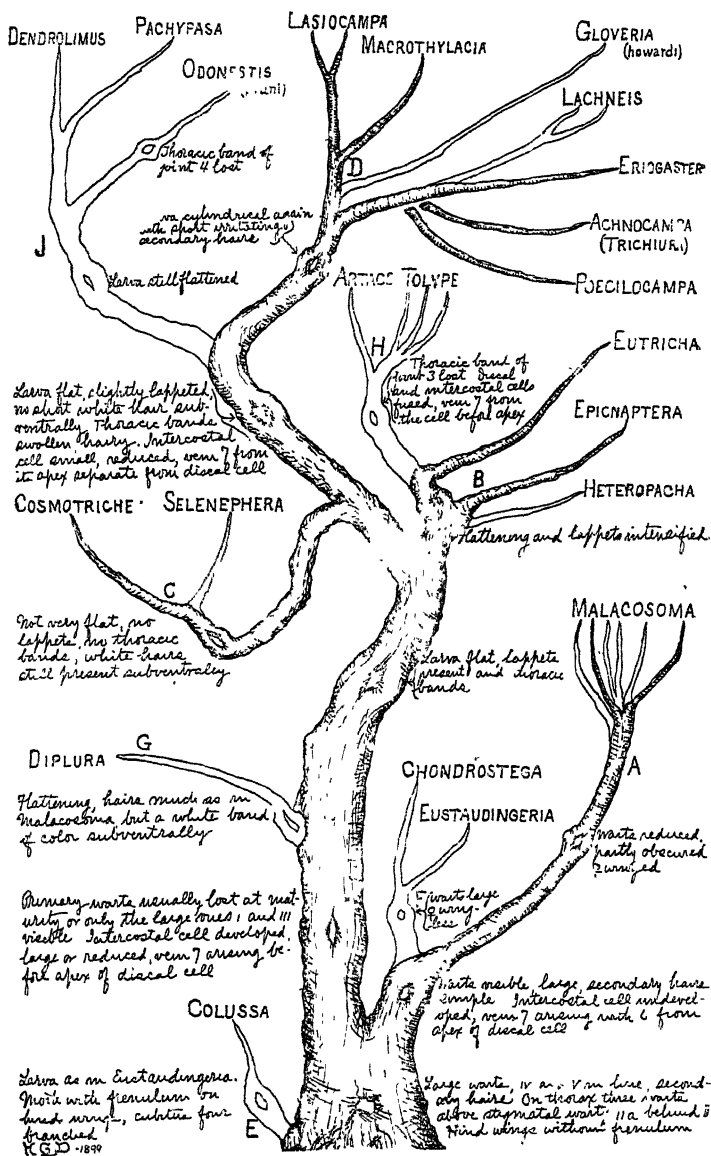
placed *Hemierus* next the *Forficulidae* as a family, and Mr. Green's researches having cleared up the mystery of *Dyscritina*, if we reject *Typhlolabia larva*, Phil., as probably being an *Iapyx*, the insect in question is the last of these uncertain earwigs. After asking the above question, and giving a brief account of the various mentions of *C. agilis*, Dr. Krauss suddenly replies, asserting that it is the larva of an *Embia*. The form of the anterior metatarsus is a clue to its relationship with the *Embiidae*, and after a careful examination he ends up by considering *Condylopalama agilis*, Sund., as the larva of *Embia* (*Olyntha*) *nobilis*, Gerst., of which it must, therefore, be regarded as a synonym.

Scudder has followed up his great *Revision of the Melanopli* with a supplement (published in the *Proc. Davenport Acad. of Sci. Iowa*, vii., 1899, pp. 157-205, pl. vii-ix). He describes 23 new species of *Melanoplus*, a genus which already contained 131 species. The same prolific author has given us a "Monograph of the genus *Schistocerca*" (*Pro. Amer. Acad. Arts and Sci.*, xxxiv., No. 17, March, 1899). He shows that *S. peregrina*, Oliv., the only Old World representative of the genus, occurs also in South America, and considers it highly probable that Africa was originally colonised by this species from the eastern coast of South America. To back up this theory he brings forward accounts of specimens taken in the middle of the Atlantic. *S. paranense*, Burm., which is sometimes united with *S. peregrina*, he separates by the width of the elytra, comparative width of the metazona of the pronotum, and by the form of the cerci.

Mr. J. J. Walker records (*E.M.M.*) the capture of *Quedius longicornis*, Kraatz, at Cobham Park, also the equally rare *Longitarsus rutilus*, Ill., on *Scrophularia aquatica*, at Halstow, Kent. The Rev. A. Thornby also mentions that he took eight specimens of the rare *Cryptocephalus erignus*, Schneider, in a little marsh in north Lincolnshire, in June and July last; whilst the Rev. Theodore Wood records the capture, by Mr. T. H. C. Taylor, of *Gnorus variabilis*, L., in July last, at Balham.

Lord Walsingham calls attention to the fact that a new regulation, relating to the sending of insects by "sample post," came into operation on January 1st, 1899. This regulation reads (*Post Office Guide*, p. 424) as follows:—"PATTERNS AND SAMPLES.—Natural history specimens, dried or preserved animals and plants, and geological specimens, may be forwarded at the sample rate when sent for no commercial purpose, and packed in accordance with the sample post regulations. *Limits of size and weights*.—(1) British colonies or possessions and non-union countries—5lbs., 2ft. × 1ft. × 1ft. (2) Foreign countries in postal union—12ozs., 12in. × 8in. × 4in. *Rate of postage*.— $\frac{1}{2}$ d. per 2oz. (minimum charge 1d.). *Packing*.—Must be sent in such a manner as to be easy of examination, and, when practicable, must be sent in covers open at the end. Letters may not be enclosed, but descriptive labels are permitted."

Mr. A. D. Michael is at present engaged in writing a monograph of the "British *Tyroglyphidae*" for the Ray Society. He is in need of living specimens of the species which is said to work destruction in neglected collections of dried insects—the dreaded "mite" of cabinets. He would be greatly obliged if any entomologists who are so troubled would send him the broken insects and débris, in a small, dry, wide-mouthed bottle, securely corked, addressed to A. D. Michael, Esq., The Warren, Studland, near Corfe Castle, Dorset.



PHYLOGENY OF THE LACHNEIDES (LASIOCAMPIDAE).

The Entomologist's Record

AND

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The Phylogeny of the Lasiocampids. (Illustrated by Plate.)

By HARRISON G. DYAR, Ph.D.

Mr. Tutt has requested me to give my views on this subject in a critical form, referring, I presume, more particularly to his recent paper in the *Proceedings of the South London Entomological and Natural History Society*, 1898. Mr. Tutt has there constructed a genealogical tree for the genera of the family of the British species. He modestly disclaims any special value for this tree, yet, except in regard to the position assigned to *Malacosoma* and *Poecilocampa* (which I would transpose), it corresponds rather closely with one that I have prepared, and I think it is mainly on the right lines. I will give as briefly as possible the reasons which have led me to form the tree as I have done.

Returning first to Mr. Tutt's paper, I notice that he does not understand why I call the family *Lachneidae*. This is simply an attempt to apply the rule of priority to family names. I take it that any name in plural form (-ides, -ina, -idae, &c.) is valid if it is founded on a valid generic name, i.e., one not preoccupied, or a synonym. When several such names have been proposed, I would take the oldest, and in this case Hübner's *Tantamen* term *Lachneides* (*Lachneis*) is the earliest such term that I find. I have only changed his ending in accordance with recent usage. Again Mr. Tutt says that I "drop *Phylodesma* altogether." I have applied the term to the South American *phidonia*, Cram. Hübner places in *Phylodesma*—*phidonia*, *quercifolia*, *populifolia*, *ilicifolia* and *tremulifolia*. The four latter being removed to other genera, *phidonia* remains as the type.

I do not propose to discuss Mr. Tutt's phylogeny of the *Lasiocampidae*, as the subject is too large for the present purpose. I may, however, simply refer to my own view on the subject, published in the *Proceedings of the Boston Society of Natural History* (1896), vol. xxvii., p. 146. Returning, however, to the relationships of the Lasiocampid genera among themselves, the English species divide into four phyla:—

Phylum A.—The larva is cylindrical, primary warts not altogether obscured, secondary hair simple; no special structures. Moth with ordinary venation, veins 6 and 7 of hind-wings from the end of the cell, vein 8 forming a small intercostal cell at base by anastomosis with the discal cell.

Phylum B.—Larva flattened, primary warts visible only as far as the largest ones, i and iii; secondary hairs modified with white hairs subventrally; lateral lappets and coloured thoracic bands. Moth with extraordinary venation, intercostal

cell of hind-wings greatly expanded, confluent with discal cell nearly to apex, and finally forming a connection with vein 7.

Phylum C.—Larva degenerating, less flattened, but still with white tufted hairs subventrally; primary warts obscured, the other special structures lost. Moth with the intercostal cell of hind-wings less expanded, but carrying vein 7 back with it from the apex of discal cell.

Phylum D.—Larva again cylindrical, densely hairy, some of the secondary hairs specially modified into irritating hairs; white subventral hairs lost. Moth with intercostal cell very small, but vein 7 arises from its apex with vein 8, and is not connected with the discal cell.

Phylum A, I regard as distinctly the most generalised; it contains the genus *Malacosoma*. Phylum B, I was at first inclined to place much higher, but the venation of the moth seems to preclude any other position. The group contains *Epicnaptera* and *Eutricha*. Phylum C is closely allied, but the larva is decidedly less specialised. I take this to be due to degeneration, rather than to generalisation, since the venation of the genus, *Cosmotriche*, seems derivable from *Epicnaptera* and not the reverse. Phylum D is the highest. A degeneration from the flattened larva of phylum B having been once assumed, it is easy to imagine this proceeding further to the round hairy larvæ of *Lasiocampa* and *Macrothylacia*. *Eriogaster* has the hairs less developed, but evidently belongs here, and I presume that *Achnocampa* (*Trichiura*) and *Pocilocampa* do also, though their larvæ are not at present before me. The venation is very singular. Vein 7 instead of arising from the discal cell is quite separate from it, and arises from the basal loop of vein 8. I think this is only explicable by supposing a contraction of the large intercostal cell of phyla B and C, which has carried vein 7 with it away from the discal cell.

So much for the British species. The accompanying tree in large part explains itself. I have added several European and American genera, and one Australian genus, which are distinguished from the English ones by the absence of shading on their respective branches. Five special points may be noted:—

Phylum E is the Australian *Colussa*. It is the most generalised larva of the whole group, closely resembling that of *Eustaudingeria*. Indeed the genus scarcely belongs here, as the moth still retains the frenulum.

Phylum F is the most generalised phylum known of the true Lasiocampids. The females are wingless, but the male venation closely resembles *Malacosoma*.

Phylum G is a very curious form. The larva has much the structure of *Malacosoma*, but the adaptation to the flattened form has begun, and the subventral shadow is neutralised by a white band, not by white hairs as higher in the scale. The moth has already the large intercostal cell of the hind-wings.

Phylum H is an American group, at first sight quite contradictory with the larva of *Eutricha* or even more specialised, and the venation almost of *Malacosoma*. I interpret the absence of the large intercostal cell to degeneration, by a process different from that of phylum D. Here it seems that the lower border of the cell has joined the discal cell, leaving vein 7 again arising from it, but before the tip of the cell.

Phylum J is a group not represented in England, intermediate between phyla B and D. The larva retains most of the characters of phylum B, though they are generally less strongly developed, while the moth has assumed the venation of phylum D.

Ancient and modern Lepidopterological history: *Scoparia dubitalis* ab. alba, n. ab.

By J. W. TUTT, F.E.S.

In the *E. M. M.*, vol. xxxv., pp. 103-104, Mr. H. F. Fryer notes the capture of a pale form of *Scoparia dubitalis* described as "fore-

wings creamy-white; lines obscurely indicated by narrow ochreous suffusions; 8-shaped discal mark absent. Hind-wings very light-fuscous, cilia white." A figure of this individual, together with typical *dubitalis* and "the intermediate form known as *ingratella*," which "was not scarce" are also given. To this Mr. Fryer adds: "Had I not taken the light variety of *Scoparia dubitalis* in company with the above, I should have undoubtedly considered I had taken a new species. However, on my sending specimens to Mr. Barrett he informed me that he considered my capture a variety only of *S. dubitalis*, but that it was quite new to him."

Now, had this been published anywhere except in the magazine in which it appeared, one would have supposed that Mr. Fryer had made as much as possible of a well-known detail in the variation of this species, had, as is usual with many who record their captures, omitted to look up any literature whatever on the subject, and had misunderstood Mr. Barrett's communication.

This lapse of memory on the part of Mr. Barrett is quite unaccountable. In January, 1886, I wrote (*Entom.*, xix., pp. 129-130) a long note, detailing the occurrence of the pale form known as *Scoparia ingratella* in the neighbourhood of Deal in the early part of July, 1885, and state: "I noticed, however, flying among the others, two or three specimens apparently bleached, and thinking they were very wasted I did not take them. However, observing one at rest and remarking that it looked comparatively fresh, I boxed it, and on arriving home and looking over my captures was surprised to find a remarkably pure white *Scoparia* whose species would, at least, have been exceedingly doubtful; however, taking the surroundings of the insect into account I think it more than probable that the insect is a white form of *S. ingratella*. Showing the specimen to my friend Mr. Coverdale some time afterwards, and telling him where it was captured, he told me that he had one, taken the previous summer at the same place. His, however, shows the markings, although very indistinctly." I have Coverdale's and my own examples (with other later captures) now. The next note bearing on the subject appears to be from Mr. Banks, who writes (*F. M. M.*, xxiii., p. 258): "At the end of June, when collecting on the Purbeck coast, I was fortunate enough to meet with four examples of a most beautiful and striking variety of *Eudorea pyralella*. The fore-wings are pure white, and, with the exception of a few coloured scales at the base and a small wedge-shaped blotch and dotted line at the extreme hind margin, the only markings are contained between the first and second lines, and are of the usual type and colour; the space enclosed by these lines shows out against the clear white ground colour as a well-defined and conspicuous central fascia. There is not the faintest trace of any subterminal band. . . . These four specimens of this pale variety were all I could meet with out of numbers of the usual type." The next note on the subject is written (*Ent. Mo. Mag.*, xxiv., p. 43) by myself: "Varieties of *Scoparia ingratella*, somewhat resembling those mentioned by Mr. Banks, occur in moderate numbers among typical *S. ingratella*, which is found commonly on the coast, near Dover, Folkestone, and Deal, although the variation is more extended and general than it appears to be in the Purbeck locality. I have a dozen striking pale varieties of *ingratella* in my series, which I captured in July last, 1886, showing almost

every intermediate form between the type with white ground colour and distinct markings and pure spotless white." A description of certain forms follows, and I suggest that Knaggs' addition—*ingratella*, Zell.—can be nothing but *dubitalis*, i.e., that *dubitalis* = *ingratella* = *pyralella*. I also point out that there appears to be a considerable difference in favour of Cuxton compared with Dover in the time of the appearance of the insect. All these references, and others referring only to ordinary *ingratella*, were collected by South in 1890 (*Ent.*, xxiii., p. 278). Even Knaggs, in his original note introducing *S. ingratella*, Zell., as British, says (*E. M. M.*, iv., p. 61) that "the black markings may be absent or very faint."

Reference to *Entom.*, x., p. 92, would have prevented another statement from Mr. Fryer which runs: "Until the larva has been found and the species (?) bred, I am afraid I must rest content with having taken a variety only," &c. We read there that "Machin reared *S. ingratella* from larvæ in the roots of sorrel collected at Folkestone in April, 1874." We wonder why South says "1867" in the *Ent.*, xxiii., p. 278!

I have kept throughout these quotations the term "variety," where it has been misused for the term "aberration." To prevent this white aberration of *Scoparia dubitalis* being again forgotten, we propose in future to designate it *Scoparia dubitalis* ab. *alba*, n. ab.

Collecting Lepidoptera in Jamaica.

By W. J. KAYE, F.E.S.

In a previous note (*ante*, p. 57) I have given some account of the lepidoptera of Trinidad. After collecting in such a rich island as this, the number and variety of insects to be met with in Jamaica are disappointing. Although only about 8° further north, the whole aspect is changed. The number of butterflies has fallen from something like 220 species to, roughly, 80 species, although the island is over three times the area of Trinidad. The vivid colourings also have, for the most part, given place to the more sombre tints of the species belonging to the Nearctic region. Before a definite statement is made one needs further proof, but I am strongly of the opinion that Jamaica is one of the points where the faunas of the sub-tropical and Nearctic regions overlap. In the neighbourhood of Kingston, butterflies are rare, but the Heterocera make up the deficiency. If there is any garden with a good show of flowers, particularly jasmine blossoms, one can be pretty certain of plenty of sport at dusk. Enormous hawk moths of the genus *Cocytius*, accompanied by numerous other species of this family, are sure to be hovering over the jasmine, which to me appeared to be quite their favourite resort. I doubt if it has been remarked before, but, to me, the most interesting feature of the lepidoptera of the island was the number and diversity of the *Sphingidae*. In the present state of our knowledge it is difficult to estimate the number of species, but we ourselves took 19 species on as many nights. Besides being taken at jasmine, they are, on warm cloudy nights, a source of great annoyance to householders who have their windows open, as they constantly come in and put out the light. My stay in the Kingston district was only of three days' duration, but it was sufficient to give one an idea of what was to be met with. By the roadside that wholly New World

genus *Colaenis* was represented by many specimens of *C. debila*, while with it were examples of the black and yellow striped *Heliconius charitonia*, also belonging entirely to the New World fauna. This insect loves semi-shady roadsides, and flies in a tantalising manner just above one's head and settles on the outer branches of trees, seemingly only for rest, as, in such situations, there were no flowers. *Cystineura dorcas*, a very fragile-looking insect of fawn and white colour, appeared to delight in the driest and sunniest of situations, the former taste being quite exceptional in the tropics for butterflies. In contrast with this, *Callisto zangis*, which might have passed for an *Frebia* on the wing, was to be noticed gently flying amongst dank herbage never at any distance from the ground. *Anartia jatrophae* (the "biscuit" of the Trinidad nigger) has here altered in coloration, and has assumed the darker form known as var. *saturata*. In the gardens around Kingston the Pierid, *Kricogonia lyside*, with its so-called wet season form *teressa*, is excessively abundant, and is a pest to the horticulturist. Both forms were taken in the same place and on the same day in the height of the dry season. A true *Pieris*, *P. amaryllis*, is, however, very rare, and its larva is unknown. It is pure white, with a large black discoidal spot, and spans about 2½ in. The yellow Catopsilids are always in evidence, and congregate in immense numbers to a puddle of water. The deep orange-coloured *C. argante* is much less common, but is found in company with *C. sennöe*. Wishing to do as much collecting as (and the best) possible, I decided to go to Bath, in the eastern corner of the island, where rain falls almost incessantly throughout the year, and where the vegetation is at its height for Jamaica. I will not dilate on that memorable 44 miles in a buggy except casually. The interest and picturesqueness of such an undertaking are worth all the trouble. Entomologically, parts are good and parts are devoid of life. Whenever we neared a village (settlements of three houses and upwards) *Papilio polyrates*, the West Indian form of *P. polydamas*, was invariably noticed, with its wonderful hovering habit at flowers, similar to the humming-birds, which I am glad to report are increasing again under the protection now offered them. The larva of *P. polyrates* feeds on *Aristolochia*. There are some six or seven *Papilios* in the island, of which, the giant, *P. homerus*, I shall mention later. The particular Jamaican *Papilio*, *P. sinon*, besides the above, is not at all common. It is to be found some five miles out of Kingston, near the foot of the Blue mountain range. The name blue is not fanciful. In the very early morning, when the sun is just rising, the peculiar light and shade effect gives one the idea that the mountains are of a deep indigo-blue colour. Continuing the drive towards Bath, after the 24th milepost was past, we came into a bit of road with high hedges on either side, and these were the haunt of a giant relative of *Gonopteryx rhamni*, by name *Amyntia maerula*. A temporary unwelcome shower of rain was the cause of some puddles in the road, and it was from these that one had the only chance of netting the 3½ in. brimstone. From this point, for several miles, *Catoxilia sennöe*, another brimstone-coloured insect, was never lost sight of, and frequently parties of a dozen or so were noted, struggling to suck up the last drop from a roadside puddle. A bend in the road, and I caught a glimpse of what I had been looking forward to see, *Paphia (Anoea) portia*, a grand insect of rich red colour. The insect was excessively wary and delights in steep rough places,

as I later discovered. I was too late for it, July being the best month. On the weedy banks by the side of the road, *Phyciodes frisia* was common. This is one of the butterflies that loves dry situations. It is exceedingly fragile, and is without doubt relished by birds, as a majority of the specimens had wedges taken out of the wings. While on the dry situation loving species, mention should be made of that puzzling genus *Terias* (*Eurema*). These fragile-looking little black and yellow butterflies, about which so much has been said regarding the dry and wet seasonal forms, were always abundant at the side of the road. Regarding those species that fell to my own net (*T. enterpe*, *T. lydia*, and *T. elathea*), I assert most strongly that to separate the forms of each under the heads of "dry," "wet" and "intermediate," is at variance with the facts of the case. There is not the slightest doubt that many of the forms are "weather" varieties, in the sense that the perfect insects have undergone changes as perfect insects, but not as pupæ. One does not find in the above three species, worn specimens, anything approaching the colour of the freshly emerged individuals. To illustrate this. Specimens of *T. enterpe*, a yellow species, after being out some time, were constantly being mistaken for *T. albula*, a genuine white species. A *Terias*, that was noticed to have a different habit from the general rule of being found in dry situations, was *T. westwoodii*, Bois. It was particularly a wet-situation insect, and had a much more powerful flight. I noticed it at about 2,500 feet elevation as well as in the valleys. Never more than one or two were seen at one time. In the Bath district several butterflies, not observed before, were met with. Quite the butterfly was *Victorina steneles*, a grand green and black insect, which was in the greatest profusion on the rotting mangoes lying on the ground. They were to be caught without any trouble and thoughts of a long chase after a specimen in Trinidad came to my mind. Now and then a specimen of *Gnaecia dirce* would descend to the rotten fruit, but it was not easily taken, and required some careful stalking. This species is particularly fond of very damp spots, where it darts about with a peculiar jerking flight, stopping to settle on a bare tree-trunk, when the remarkable zebra-like markings of the underside are not so conspicuous as one would imagine. This insect has the power of making a sort of crackling noise in flight. The *Hesperiidae* were very well represented. A very interesting fact with regard to the *Perichares* group of the sub-family *Pamphilinae*, of which *P. corydon*, a skipper of 2½ in. expanse, is a representative, I noted to be that they flew much more freely at dusk, thus bearing testimony to the name *Hesperiidae*. In front of my lodging there was a large clump of cannas (Indian shot), and this was the resort, as I had frequently noted elsewhere, of *Calpodus ethlius*, a very handsome skipper. A few of the life-histories of the *Hesperiidae* have been worked out and published in the *Journal of the Institute of Jamaica* for March, 1898, by Mr. E. S. Pantón. He has there a good account of the habits and early stages of *Achlyodes philemon*, Fab., *Pyrrhus montivagus*, Reak., *Perichares* (= *Carystus*) *corydon*, Fab., and *Pamphila phylacus*, Drury. Speaking about *P. corydon* he says that the ♀ lays her eggs late in the evening most frequently on the leaf of the sugar-cane, but also on Indian corn and on a grass, *Panicum maximum*. The females observed were seen to lay their eggs singly, either on the upper or under side of the leaf. Continuing my hasty tour round the

Blue mountains, the next thing to be done was to climb the Cuna Cuna Pass. Right on the summit, 2,700ft. a new little butterfly was taken. It proved to be *Phyciodes proclea*, a rare insect. It is a very small Nymphalid and is related to our Melitæas.

The scene on the top of this pass is truly wonderful. Every tree is covered with epiphytes and the ground is one mass of a variety of ferns, which are supplied with water from innumerable springs. On descending not an insect was seen, and I should doubt if anything can breed in this gloomy spot, where the atmosphere must be saturated on nearly every day in the year, for, in addition to the water from below, there is an overwhelming supply from above in the form of rain. Having arrived at the foot of the mountains on the N. side, we are in the home of *Papilio homerus*, one of the largest and rarest of the known Papilios. I learned from two boys who each had a damaged specimen (they had been asked to catch them for an entomologist in New York) that they were very lazy and that you did not require a net! One of them said he caught his specimen with his fingers off a banana plant. It of course does not feed upon banana, but upon a very different-looking plant, the name of which, however, has never yet been given. I had thought that Mr. Taylor, of Kingston, Jamaica, had given it a name when he described the larva and pupa in the *Trans. Ent. Soc. Lond.*, or else I should have brought away sufficient of the plant for identification. Mr. Taylor, who took a larva from the tree (all the larvæ have come off one tree) in November, 1893, bred the perfect insect the following month. Mr. Nicholas saw one flying in May, and the two boys mentioned took theirs in July. It thus seems that there is no particular time of year when one may expect to meet this fine insect. There were some insects here that I had not noted before in the island; such were *Aphrissa statira* in the greatest profusion, *Appias poeyi*, and one or two others. Very few moths came to light except some small *Pyrallidae* although the weather seemed all in their favour, but being situated in a narrow valley shut in on all sides may have accounted for the scarcity, a light being very much more attractive at an altitude above the surrounding country. From this point (appropriately called Ultimate) I made my way *via* Port Antonio to Castleton, famous for its Botanic Gardens, where plants and shrubs of all kinds grow to the height of luxuriance. Here the *Sphingidae* were again predominant. Except for the larvæ of *Pseudosphinx tetrio*, which strip the Frangipanny of its leaves, I saw none of the caterpillars of these monsters. *P. tetrio* has a larva of velvety-black, with the segments banded yellow and a very long slender pink caudal horn which is attached to an excrescence on the twelfth segment and which the larva can move backwards and forwards at will. The perfect insect varies greatly both in size and markings. My specimens measure from 4in. to 6½in. in expanse. From Castleton to Kingston was the next stage of the journey. On the last day of my stay I made the acquaintance of Mr. C. Taylor, who gave me much valuable information as well as a large number of insects I was unable to procure myself. These included *Emphyreuma pugione*, a very handsome "burnet"-like Arctiid that feeds on the deadly yellow nightshade; *Euthisanotia timaisca*, a Noctuid that destroys the lilies in the Kingston gardens; *Protoparce jamaicensis*, a *Sphinx* that feeds on the French cotton tree; *Papilio*, n. sp., near *cresphontes*, taken in Grand Cayman Island, the larva feeding on a

species of *Citrus*; besides many others. The following day at 8 p.m. we were in our deck chairs pondering over some of the experiences, which, if not thrilling, were at least intensely enjoyable. The visit lasted from August 12th-30th (1898).

Contribution to the Life-history of *Tinea vinculella* var. *leopoldella*.

By A. BACOT.

The CASE is about one-quarter of an inch in length, almost flat ventrally, curved on dorsal aspect, becoming rounded and broader at the ends, and widening out centrally; the greatest width about one-eighth of an inch and the greatest thickness (dorsal to ventral aspect) about one-sixteenth. The case opens at either end beneath; the doors, which are formed by a continuation of the ventral portion of the case, are closed against the under surface of the broadened and rounded ends. The case is composed of fine whitish silk covered with small grains of sand, lichen, &c., which are cemented or otherwise attached to the silk. The case, as previously mentioned, is double-ended, and either door can, I believe, be opened at will, but, so far as observation goes, I have not seen this done in actual practice. Owing to the flatness of the ventral surface a large amount of dorsal overlap occurs at the ends; the case can be drawn very close to its resting-surface, and the doors even if open are securely hidden.

The LARVA is just upon three-sixteenths of an inch when fully stretched (? not quite full grown), but, unless attempting to crawl (on glass), it lies in a curved cramped position with the dorsal area arched and the thoracic segments drawn up. The ventral area of the abdominal segments is flat, the dorsal area curved. The larva, as a whole, is grub-shaped, very like the larva of a Psychid. The prothorax is long and narrow, the second and third thoracic segments and first and second abdominal segments widen gradually; behind the second abdominal segment the larva swells out suddenly, tapering gradually towards the anus and ending rather abruptly in a rounded anus. The swollen third to ninth abdominals are of a bright orange colour, the thoracic and first two abdominal segments pale whitish or drab, but with no trace of orange-yellow. The head is rather long and flat, the clypeus extends upwards or backwards to near the crown of the head, above its apex the division of the lobes is distinct. The antennæ are rather long and prominent. The colour of the head is dark brown, slightly paler near the crown, the surface glazed; it bears a few fine hairs. The head appears to be partly retractile, but now that the larva is out of its case it does not retract it. The prothorax is glassy and horny, rounded in front and tapering behind before it joins the mesothorax, giving the larva an unusual and peculiar appearance. The prothorax is pale in front and brownish behind; in its centre (dorsal area) there is a dark brown, almost black, heart-shaped blotch, with its apex to the front. About the middle of the prothorax, on the sub-dorsal (lateral) area is situated a pair of long hairs (one much longer than the other); this long hair has a large cone-shaped tubercular base (dark coloured). The long hair arising from this tubercle is movable at will, and is used apparently as some kind of sense-organ (possibly analogous with a cat's whiskers); it is used to touch the surface in front of the larva, on which it will shortly crawl. The true legs are fairly strong and serviceable. The first pair short, the second

longer, and the third about twice the length of the first pair. They are horny and glassy, and bear several hairs at the joints; they are brownish towards the tip. The pro-legs show up as an oval ring of chitinous points or hooks on the third, fourth, fifth, and sixth segments, the hooks on the anal claspers form only a single row. The hairs appear to be as in *Psyche*, in the lateral area, viz., a small anterior (i), longer posterior (ii), both sub-spiracular (iv and v), but I cannot trace the spiracles themselves.

The above description was made from a living larva, sent by Dr. Chapman from Cannes, on March 5th, 1899. On April 16th the examination of a dried larva showed more distinctly that the anal prolegs have only a straight row of hooks, not a partial ring (horse-shoe shaped) as in *Psyche* and *Solenobia*. The dorsal flap has a group of small but stout chitinous spikes. There are certainly two sub-spiracular hairs, and of the dorsals, that arising from tubercle i appears to be the larger.

Stainton states most emphatically, *Tin. of Southern Europe*, p. 272, in his account of *T. leopoldella* (in which he quotes Costa's original description), that this insect is undoubtedly a "var. thorace immaculato" of *T. vinculella*, H.-Sch., and that it is identical with the insect which he found in some abundance in the larval stage on the trunks of the trees in the Villa Reale, Naples, on February 4th, 1869. Standinger follows Stainton, and gives (*Cat.*, p. 271) *leopoldella*, Costa, as a var. of *vinculella*, H.-Sch.

Relationship of the Micro-Psychids and the Tineids.

By J. W. TUTT, F.E.S.

Mr. Bacot was good enough to submit some of the larvæ of *Tinea leopoldella* to me, and I made a careful examination of them under the microscope. I was much struck with their general Psychid appearance, enhanced by the way they dragged their case after them, and the nature of their food, &c. It is true that the case is open at both ends, rather more like a Tineid in this respect, perhaps, than a Psychid, and as Mr. Richardson had mentioned, in his inimitable memoir, that *Tinea vinculella* used both ends indiscriminately as a door, I was anxious to see whether the allied species (or var.) did so, but no amount of watching or disturbance allowed me to make the observation with regard to *T. leopoldella*. The case is carried flatter both when moving and at rest than that, of say, a *Solenobia*, but this one would expect from the physical character of a weaker and smaller larva. Except for two or three, apparently minor, but probably important, differences of structure, I should have been inclined to consider the larva rather Psychid than Tineid, but these differences will possibly make it necessary to consider the species as a member of the true Tineid stirps.

The affinities of the lower Psychids and the Tineids have not been at all clearly defined, nor does one altogether know on what grounds certain case-bearing larvæ should be referred to the Tineid rather than to the Psychid stirps. There can be no doubt whatever that structurally, in all their stages, the Solenobiids and Taleoporiids are Psychids, and that *Diplodoma* and *Xysmatadoma* are also on this stirps. It is further clear that there is no ground structurally for separating the Macro-Psychids, so-called, from the Micro-Psychids as is done by

Stainton, Meyrick, Barrett, and others. The departure has been placed somewhere near *Teichobia* (*Psychoides*) *verhuellica* (a Lampronid ?), and some of the members of the heterogeneous genus *Tinea*, e.g., *Tinea vincuella* and *T. leopoldella*, although, as we have said, probably on the Tineid stirps, have some decided Psychid habits, and suggest certain Psychid affinities. (One might here indulge in a pious hope that our micro-lepidopterists will, without delay, give us a rational generic grouping of the species now included in *Tinea*.) The Psychid habits here referred to may have been, probably have been, obtained from a common ancestor antecedent to the branching of the Psychid from the Tineid and Adelid stems, but there ought to be some readily obtainable data on which to found a definition that will separate, fairly sharply, a Tineid from a Psychid in its various stages. The imaginal tongue, the arrangement and character of the larval tubercles i, ii, the hooks on the larval prolegs, the female anal tuft, and the apterous female itself, offer certain tests. The latter, however, would exclude *Diplodoma* and *Xysmatodoma*, undoubted Psychids, from the Psychid stirps. The difficulty rests more particularly with *Teichobia* (*Psychoides*), and we have been quite unable to obtain from any of our correspondents a single larva of this species, so much wanted to settle this critical point. One could not help being struck, when Mr. Burr was expressing his regret at the South London Entomological Society, on April 28th, that so few entomologists took up the study of Orthoptera, and, in his wisdom, contrasted the ignorance of orthopterists as to the *Forficulidae*, &c., with the detailed knowledge of all the groups of Lepidoptera possessed by the lepidopterists, whether the *Forficulidae* of the world were not better known than the *Psychidae*. The fact is lepidopterists cannot yet separate, structurally, the large groups of Lepidoptera, and so few structural details are known, that it is yet a matter of opinion with some that all the small Psychids are Tineina and all the large ones Bombycids, whilst the intermediate size of the Fumeas leave these open to doubt even on this ground, and they become Tineids or Psychids, according as the judgment of the individual leads him to consider them large or small. It would appear that the imaginal mouth-parts, the arrangement of the larval tubercles i, ii, the horse-shoe shape assumed by the crochets of the prolegs, the two dorso-lateral anal spikes of the pupa, the anal tuft of the female, and the mode of egg-laying, offer more or less fairly distinctive Psychid characters, whilst the use of only one end of the larval case, and the tendency for a larva in motion to carry its case more or less upright (of course modified by weight), are also characters of secondary value. The apterous condition of the female in most Psychids is very marked, but just at present one is rather interested in attempting to learn which are the Psychids allied to *Diplodoma* and *Xysmatodoma*, that have winged females, and that are possibly classed as Tineids.

Entomological Notes from the Riviera and Locarno.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

A week at Alassio at the end of March did not give much material for guaging its attractions for the entomologist, but it appears to be the most available station between Genoa and San Remo. It is especially frequented by English people in winter, and so accommoda-

tion suitable to insular tastes and habits is more available than at a majority of the points on the Italian Riviera. It still, however, suffers from a serious drawback, it has no proper water service, wells, often in doubtful positions, being the source from which the inhabitants get their supplies. The situation of Alassio makes it doubtful whether this can be remedied, as the mass of hill behind it is comparatively small, and is isolated by the flat valleys of Andora and Albenga, which open on to the coast some three miles or so to the west and east respectively of Alassio. Alassio itself is on a very narrow strip of flat, all of which is enclosed or built upon, and the hills above are terraced for olive-gardens to a great height. There is still, however, a good deal of ground, both towards Capo Mele and Capo Croce, as well as higher up, that is attractive, whilst the valleys of Albenga and Andora, accessible by a few minutes rail or by driving, which is very cheap here, both present some attractive areas not yet wrested from their streams by cultivation. In the Andora valley the oleander is exceedingly abundant on the waste pieces by the stream, reminding one of willows and *Hippophaes* in similar spots elsewhere. One would expect *Deilephila nerii* to be common here on the occasions when it occurs. M. Constant, who has a splendid lot of bred specimens, told me that it was occasionally to be had near Cannes in some numbers, but more usually absent, precisely, apparently, like *S. convolvuli* with us, excepting that with *D. nerii* it is the larva that is usually taken.

I noted at Alassio, on March 28th:—The dull cold weather persisted to the end of our stay at Cannes, and followed us here. To-day is rather warmer and has some sun, though there is a good deal of cloud about. Yesterday *Polyommatus baton* was seen for the first time. To-day, in the Albenga valley, the dominant butterfly is *Pieris brassicae*, *P. rapae* and *P. napi*, being usually equally common. Two *P. brassicae* were seen on a tree-trunk, newly emerged, and there are still plenty of chrysalides on walls, &c. *Pieris daphnoides* was not uncommon, *Pararge megera* frequent, and *P. egeria* almost abundant. Two *Gonepteryx cleopatra* and *Polygonia egea* were seen, and one *Anthocharis belia*.

There is considerable pleasure in making an observation for oneself, no matter how well known the fact observed may be, and thus, though M. Constant had told me that *Psyche helix* was in thousands on the shore at the mouth of the Var, I was interested to observe their abundance at some places in the Albenga valley. Certain tree-trunks were covered with them, literally in thousands. These were, of course, empty cases, and I could not discover in the grass around any examples of the brood of this year. These empty cases were all firmly attached to the trees, and were probably not merely last year's cases, but an accumulation of several years. They all looked remarkably fresh, except where a hole indicated the emergence of an ichneumon. It occurred to me that the difficulty of obtaining males of this species is not altogether due to the greater abundance of females, but also to the large proportion of cases of previous years that must exist amongst any lot collected. I doubt its being easy to pick out the new ones from amongst those I saw, and so an enormous number of old ones would have to be taken along with them.

Another observation that was new to me was to find a dozen or so of empty pupa-cases of *Porthetria dispar* amongst the grass at the foot of

a willow tree, and a smaller number at others, whilst close to the ground, and hidden by the grass, were several batches of eggs on each tree, showing that the moths lay their eggs as nearly as may be where they emerge, and also do so where they will be hidden by herbage, rather than more exposed at a higher level on the tree trunks, where I had previously seen them, but not so frequently as the abundance of the species made probable, were that the usual position. Close to the ground, and hidden by herbage, seems then to be the more usual position. The colour of the woolly covering imitating dead leaves, would here be very protective, whilst it is rather conspicuous on a grey or blackish tree trunk. At Milan, in an open square, with trees growing on bare well-trodden ground, several batches of *P. dispar* eggs were seen on the trunks. At Locarno, where it seems to be in great abundance, the empty cocoons were seen everywhere, frequently under ledges of rocks, at some little distance from any food-plants. Nevertheless batches of eggs were very frequent in such places on the bare rock, near the empty cases. The distance from, and complicated route to, any suitable food-plant, seemed frequently to be such that practically none of the young larvæ could possibly reach it. Does the ♀ in this species, like the *Arctias* and others, having laid a batch of eggs at the place of emergence, take flight, now she is relieved of some weight, and lay another batch elsewhere?

On April 2nd I saw two fresh *Eurranthis plumistraria*, the first on March 31st, and to-day *Euchloë cardamines*. This is rather a rare species in the Riviera, occurring, however, at Cannes in the Siagne valley.

At Locarno, on April 5th, Psychid cases of various species were abundant, nearly all, however, last year's empty ones—*Taleporia pseudobombycella*, specially abundant, *Psyche helix*, in places. A case is common on rocks, especially by the lake near Ascona, which clothes itself in shining scales of mica (*P. zermattensis*). Some of these were still tenanted, and the ♂ moths were seen on the wing. Other species, in the absence of anything but the cases, it would be rather rash to suggest names for. *Tinea vinculella* was rare. *Aglais urticae* larvæ were seen already hung up for pupation.

Near the Madonna del Sasso a small bug (*Oryzocara lavateræ*) interested me very much. On the bare rock were several curious patches of several square inches in area that looked unusual. Each patch proved to consist of many hundreds of these bugs (each about one-sixth of an inch long) packed closely together, six or eight deep, and all quite quiescent. When disturbed and set in motion their resemblance to a swarm of ants, including many winged ones, was unmistakable. Their colours were red and black, with the membrane of the elytra colourless, glistening and shining just like ants' wings, whilst, to complete the mimicry, they emitted an odour that was chiefly that of formic acid. What advantage they gain by mimicking ants, especially winged ones, is certainly not self-evident, as winged ants are the especial prey of perhaps more enemies than almost any other insect. Is it at all common amongst bugs to be so gregarious? I do not recollect any British species that is so.

At Locarno the nests of *Cnethocampa pityocampa* were very common, all, however, already empty. They here affected *Pinus sylvestris*, and especially liked to occupy terminal branches, so that some trees, with

half a dozen or more on the leading shoot and ends of branches, looked as if decorated with Chinese lanterns. Some few trees were completely stripped of leaves. I examined carefully one small tree in this condition, and found that it was killed, not directly by the moth, but by the pine bark beetle, *H. piniperda*, which already had numerous burrows in the bark, and some eggs laid. Perhaps it is incorrect to say it was already killed, but the beetles would soon dispose of any remaining vitality, although their attack would have been impossible but for the destruction of sap material by the caterpillars eating all the leaves. The two insects together, therefore, destroy the tree, though neither could do so by itself.

Migration and Dispersal of Insects: Dragonflies.

By J. W. TUTT, F.E.S.

Sharp dismisses (*Insects*, p. 425) the migration of the *Odonata* in a single short paragraph. He notes that "they are among the few insects that are known to form swarms and migrate," and that "swarms, usually consisting of species of the genus *Libellula* have been frequently observed in Europe and America. Species of various other genera also swarm, and a swarm may consist of more than one species."

Libellula quadrimaculata is probably the species most frequently observed on its migration journeys in Europe. The estimated numbers comprising some of the swarms that have been reported by trustworthy observers frequently seem almost incredible. It is reported that a large migration of *L. quadrimaculata* takes place almost every year in the Charente-Inférieure from north to south. Wallace notices that dragonflies came on board the "Adventure" frigate when fifty miles off the coast of South America. Other observers have recorded the capture of specimens of various species at sea many miles from the nearest land.

One of the earliest records of a large flight of dragonflies is that made by the Abbé Chappe, who, in 1761, went to Siberia to observe the transit of Venus. Whilst at Tobolsk, he states that a swarm of some species of dragonfly passed the place, and he estimated its breadth at five hundred ells and its length at five leagues.

Meineken reports that he once saw, in a village in Anhalt, on a clear day, about four in the afternoon, such a cloud of dragonflies (*Libellulina*) as almost concealed the sun, and not a little alarmed the villagers, under the idea that they were locusts (*Naturforscher*, vi., 110); several instances are given by Rösel (vol. ii., p. 135) of similar clouds of these insects having been seen in Silesia and other districts, and Mr. Woolnough, of Hollesley, in Suffolk, a most attentive observer of nature, once witnessed such an army of the smaller dragonflies (*Agrion*) flying inland from the sea, as to cast a slight shadow over a field of four acres as they passed. A migration of dragonflies was witnessed at Weimar, in Germany, in 1816, and one, far more considerable, and perhaps the greatest on record, occurred on May 30th-31st, 1839, when cloud-like swarms of these insects (chiefly *Libellula depressa*) were seen at Weimar, Eisenach, Leipzig, Halle, and Göttingen, and the intervening country, extending over a large district (*Mag. Nat. Hist.*, n.s., iii., 516).

One of the first really reliable records as to the exact species concerned was that made by Dr. Hagen, at Königsberg, in 1852. The insect in question was *Platetrum depressum*, a species that is rather abundant in Britain. The doctor states that "the insects were so numerous that they formed a compact band. The last portion of the swarm took up its abode for the night in the suburbs of Königsberg, where the specimens covered the houses and trees, and the next morning proceeded on their journey in the same direction as their predecessors."

The distribution of some well-known species of dragonflies is certainly very remarkable. McLachlan records four species as captured by Mathew in the Sandwich Islands, in June, 1873. These were:— (1) *Anax junius*, Drury, a common species in North America, and also recorded as an inhabitant of the Polynesian Islands. (2) The nearly cosmopolitan *Pantala flavescens*, F. (3) A *Tramea*, apparently inseparable from *T. lacerata*, Hagen, which, originally recorded from Texas, has also been taken in Maryland, Mexico, and the north of California. (4) A small species of the *Agrionidae*. Mathew notes that the three first-named of these species were very abundant, and preyed on the imagines of a Noctuid moth, a species of *Hadena*, that occurs in countless multitudes in the islands. He states that these dragonflies used (or seemed) to follow him in numbers as he walked through the grass, darting off to the right or left in full chase as soon as a moth was disturbed.

Mathew, on the same voyage, also caught several specimens of *Pantala hymenaea*, Hagen (a species that had hitherto not been recorded from any locality south of Mexico), at Payta, Peru. This species occurred along the sea-coast, and he expresses surprise as to what the larvæ could possibly have fed on, since there was no fresh water within many miles of Payta, and rain is almost unknown there. He noted that just above highwater mark in some places there were large patches of a species of *Mesembryanthemum*, above which the dragonflies were always to be seen hawking. McLachlan considers there is no doubt that *P. hymenaea* is migratory, like its congener *P. flavescens*, and that those that Mathew saw were *en voyage*. From Vancouver Island the same observer recorded our well-known migratory species, *Libellula quadrimaculata*, which appears to be generally distributed over all the boreal parts of the Palaearctic and Nearctic regions.

An account of an extensive migration of the last-named species, which was observed at Malmö, in Sweden, on June 24th, 1883, is given (*Nature*, xxviii., p. 271) by Newton. He states that on that date an extraordinary flight of *L. quadrimaculata* was witnessed, which passed over, or through, the town or neighbourhood for about half-an-hour in the afternoon. The next day they reappeared for more than an hour; but on the 26th, at 7.30 a.m., they again began in millions, and, notwithstanding the wind had shifted to the south during the night, they held the same course from north-west by west, heading south-east by east. The streets, shipping, and every place were full of them. They did not fly very high, and seemed to avoid going into open doors and windows. Some hundred or so "alighted on the gooseberry bushes, apple and pear trees, in the garden, but never touched the fruit." One example was observed sitting on the dead tip of an apple twig, and "although pushed off with a stick thirteen

times, the insect returned each time after flying away five or six yards." The flight ended that night about 8.0 p.m., having been incessant for more than twelve hours. On the 27th they appeared again about noon, flying in the same direction, but in much reduced forces. For some days after a few were seen, but very few. "The papers say that they were observed in all southern and central Sweden, and in many places in Denmark, and they swarmed about the ships on the Sound. With their disappearance came the hot weather." It would, indeed, have been remarkable had the dragonflies eaten the fruit. The last sentence of this paragraph suggests a reason for the migration, an instinctive warning as it were, that their native pools might be dried up.

The master of the "Swin Middle" light-vessel, stationed not far from Shoeburyness, and, therefore, near the mouth of the Thames, sent examples of *L. quadrimaculata* to Cordeaux for determination, and reported that "on June 23rd, 1888, from 6.0 p.m. to 8.0 p.m., a flock of this dragonfly came on board and rested on the ropes, and even on the cable with which the vessel was moored, from the bows down close to the water's edge. The wind was east by south, the weather fine and clear," and he states that he "never saw anything like it before." McLachlan supposed from the direction of the wind that the specimens came, in all probability, from Holland, and contrived to arrive just before night-fall. The following year, 1889, Hall records a flight of *L. quadrimaculata* that he observed from the Admiralty Pier of Dover, on June 6th of that year. He incidentally remarks that he had previously witnessed extraordinary flights of this species in France, similar to that reported by Newton, as having occurred at Malmö, in Sweden, and adds that although the swarm was small, he had never seen nor heard of one like that observed at Dover. He says that hundreds of specimens of this species and its ab. *praenubila*, Newm., were to be seen flying round the middle of the pier. The weather was dull and oppressively hot, with a slight wind from the north-east, and the dragonflies appeared to have come up with the storm clouds from the sea in a south-westerly direction. The heavy rain and thunderstorm the same evening must have made havoc among them; however, hundreds were seen the next day, and a few on the 8th, but they had entirely disappeared by the 10th. They were very difficult to catch owing to their rapid movements and their habit of settling under the parapet on the outside of the pier. . . . The insects were confined to the vicinity of the pier and were not observed in the town.

Variation of *Epunda lutulenta*, Bkh.

By REV. C. R. N. BURROWS.

During last autumn I was both pleased and interested in a somewhat large capture of this insect at sugar, in my garden, and during the winter months have been trying to find out what is, and what is not, known about the species. From the books at my disposal I learned little about my captures. Stainton (*Manual*, vol. i., p. 266) describes it thus:—"F.-w. dark brown, sometimes blackish: the margins of the stigmata hardly indicated; the inner and elbowed lines sometimes visible, and the space between them darker. Hind-wings of male, white, of female, grey." Newman (*British Moths*, p. 296) says:—"Fore-

wings smoky black-brown, the discoidal spots being scarcely distinguishable from the ground-colour. In many of the females there is a distinctly darker broad median band. Hind-wings, pure silvery-white in the males, smoky-brown in the females." Meyrick (*Handbook*, p. 58) says:—"Fore-wings rather dark fuscous, discal area darker; first and second lines and margins of spots finely darker, very obscure subterminal line obscurely darker edged anteriorly. Hind-wings of male, white, of female, fuscous."

All these evidently ignore variation from the type, and it will be observed that they take no notice of the magnificent forms which have been collected of late years. Tutt (*British Noctuae and their Varieties*, vol. iii., pp. 58-59) goes much more deeply into the matter, but, after examining my specimens most carefully by the light of this exhaustive treatise, I was obliged to refer the matter to Mr. Tutt himself for elucidation, for the reason that it appeared to me that some of my takings are not described even there. In the following remarks I have been kindly assisted by Mr. Tutt, who, with the more abundant material at his disposal, has been kind enough to point out to me what he judges to be most worthy of note.

As the most comprehensive description of *E. lutulenta*, in its different forms, I take *British Noctuae and their Varieties* for my guidance. The type is described by Borkhausen thus:—"The size of *Noctua exclamatoris*. Ground colour of the fore-wings dull brown-black, slightly glossy, and tinted with reddish-ochreous, which, however, is only seen in fresh specimens. There are three indistinct, somewhat darker bordered, transverse lines. Close to the hind margin is a lighter angulated line, which forms a Latin W in the middle." "The fore-wings are blackish-brown, glossy, with an obsolete dot in the middle. Hind-wings whitish, shaded with black-brown on the costa. In some varieties the transverse lines are scarcely to be seen, there being, indeed, only a faint trace of them" (*Naturgeschichte*, &c., p. 576).

So far the type. As to the known aberrations. Mr. Tutt points out the errors into which Dr. Staudinger and, following him, Mr. W. F. de V. Kane appeared to have fallen. He lays special stress upon, and describes at length, the beautiful aberrations found in Scotland and Ireland, which principally differ from the typical form by their intense blackness, the ground colour of the upper wings resembling that of *Epinda nigra*. Mr. Tutt assures me that there is no doubt that the Kent form (and I presume the Essex type form likewise) and the ordinary Continental forms are practically identical.

This material, captured at Mucking, comes in as a sort of supplement to the account in Mr. Tutt's book, of which I give a short synopsis. He arranges his forms thus:—

- (1) F.-w. unicolorous ashy-grey = ab. *consimilis*, Stephens.
- (2) F.-w. unicolorous brown-black = *lutulenta*, Borkhausen.
- (3) F.-w. ashy-grey with black central band = ab. *sedii*, Gn.
- (4) F.-w. glossy-black with blacker lines = ab. *linneburgensis*, Frr.
- (5) F.-w. glossy-black with white lines = ab. *albidilinea*, Tutt.
- (6) F.-w. as (4), but having white spots in reniform = ab. *tripuncta*, Frr.

In this list it will be noticed that the type form alone has a brownish coloration.

Now, with the exception of seven specimens, the whole of my captures are brownish, while at the same time they follow closely the

form of many of the above aberrations, e.g., there is no ab. *sedī*, but there is a reddish-brown form with dark central band, and so on. I took altogether about 130 specimens. Some I rejected, a very few I allowed great friends to take away with them, but I set out, and have now before me, 99 individuals. The greater number must be referred to the type—53 specimens. In these there is a great deal of minor variation to be observed in the colour and distinctness of the central band, and the transverse lines, as well as in the outlines of the stigmata.

After these come a considerable number, 34 (18 males and 16 females), of what may be called the extreme form of the type, and which, indeed, appear to be hinted at by Borkhausen in his original description. In this form the reddish or brownish-black of the type prevails, but there is scarcely a trace of transverse lines, central band or spots. For this form I would suggest the name ab. *unicolor*, n. ab.

At the other extreme are three specimens with the ashy-grey of Stephens' ab. *consimilis*, but with distinctly marked central band slightly darker, making the stigmata more distinct, and, though so much larger, recalling *Epunda riminalis*. These three are all females, but one has the white hind-wings, usually characteristic of the male, only slightly shaded with grey on the outer margin. The others have the ordinary grey hind-wings. This I would call ab. *cinerea*, n. ab.

Parallel with ab. *sedī*, Gn., but not *sedī*, owing to the contrast between the central band and the grey outer margin being less marked, is another form. The males with a blackish-fuscous central band, with the outer and inner margins cinereous-grey, of the same tint as ab. *cinerea*, the females with the band marked off from the outer and basal area by a pale margin on either side, but the outer and basal areas only a little paler than the central area. As this form approaches ab. *sedī*, Gn., I would call it ab. *approximata*, n. ab. Of this I have 5 specimens—2 males, 3 females.

Lastly, there remain two males and two females, of a distinct black ground colour, with the fuscous scarcely showing. The males with the black dots upon the nervures of, and the females with dark blackish-grey, hind-wings. These Mr. Tutt feels certain should be referred to ab. *lüneburgensis*. They are most certainly, he assures me, the nearest specimens to this form that he has known to be taken in our south-eastern counties.

The sexual dimorphism of the Mucking specimens is well worth noting. The hind-wings of the males, white, and of the females, grey, the latter varying from white with a grey margin to very dark blackish-grey. The black dots on the nervures of the hind-wings present in the Irish and Scotch aberrations, very rarely present.

I will only further note that Borkhausen's suggestion that the reddish-ochreous tint is only seen in fresh specimens is somewhat erroneous, for the three poor specimens that represented my series until last autumn are of the reddest, and are, I should imagine, more than twenty years old.

I have found it extremely difficult to judge the colour of the specimens by lamp light, when the red or brown tones disappear, and the insects become almost black. I have, of course, been careful to examine those described above by daylight.

I do not find the central band peculiar to, or even more common in, the females than in the males, as Newman says they are.

EXTENDED SYNOPSIS.

- (7) As type—but all markings most obscure = *ab. unicolor*, n. ab.
 (8) As (1), ashy-grey, with dark central band = *ab. cinerea*, n. ab.
 (9) Almost *seili*, but contrasts not so marked, and brownish instead of black
 = *ab. approximata*, n. ab.

Of 99 specimens taken at Mucking—53 are typical, 24 males and 29 females; 34 *ab. unicolor*, 18 males and 16 females; 3, *ab. cinerea*, 3 females; 5 *ab. approximata*, 2 males and 3 females; 4 *ab. lineburgensis*, 2 males and 2 females. These give a total of 46 males and 53 females.

Insects from the higher latitudes of North America.

Of the many interesting volumes published by the University of Iowa, that entitled *Explorations in the Far North*,* by Frank Russell, which has just come to hand, is one of the most so. It is, however, a book for the general naturalist rather than the entomologist, and is a report of an expedition made in 1892, 1893, and 1894, in the country lying between the Rocky Mountains on the west, Hudson Bay on the east, and the Arctic Ocean on the north, and deals with various branches of scientific observation and research which the author undertook in these little known districts. Besides a most interesting account of the Indians who live in the district, their habits, myths, &c., there are full lists of mammals, birds, fishes, and insects met with, accompanied in many instances by full and copious notes. It is, however, only the insects that interest us here, and these, of course, from the point of view of the light thrown on the circumpolar fauna known to be common to the Holarctic region of North America, and north Europe and Asia. Unfortunately the insects collected on this expedition are comparatively few in number, in consequence of the time being fully taken up with more conspicuous forms of life, and apart from a locust (*Melanoplus bivitatus*, Say), a humble-bee, a Phryganeid, and a dipteran (*Dilophus*), all from Grand Rapids, they belong to the orders Lepidoptera and Coleoptera, and, in general, represent species which are characteristic of, or common in, the pine-covered regions of Canada and the country of the Great Lakes, some, indeed, extending far south of the Canadian boundary.

Among the species obtained the following are noted:—*Euanessa antiopa*, several specimens of which were obtained at Fort Rae in August. *Aglais milberti*, a species, if distinct, very closely allied to *A. urticae*, from Fort Rae. *Attacus cecropia*, also from Fort Rae.

The Coleoptera were more representative:—*Trachypachys inermis*, *Bembidium variegatum*, *Pterostichus vitreus* (*orinomus*), *Amara erratica*, *Platynus sinuatus*, *P. obsolitus* (= *P. boyemanni*), *P. picipennis*, and *Harpalus basilaris* among the Carabidae. *Ilybius pleuriticus* represented the Dytiscids, and was taken on the ice on Slave Lake. *Gyrinus maculiventris*, among the Gyrinidae; *Hydrobius fuscipes*, the Hydrophilidae; *Necrophorus pustulatus* var. *meisheimeri*, and *Silpha lappona*, the Silphidae; *Arpedium cribratum*, the Staphylinidae; *Coccinella transversotata* and *Coccinella monticola*, the Coccinellidae; *Corymbites morulus*, the Elateridae; *Dicercia tenebrosa* and *Melanophila longipes*, the Buprestidae; *Ellychnia corrusca*, the Lampyridae; *Merium proteum*,

* *Explorations in the Far North*, Frank Russell, 289 pp., map., and many illustrations, 1898. [Published by the University of Iowa, U.S.A.]

Xylotrechus undulatus, *Leptura sexmaculata*, *Monohammus scutellatus*, and *M. confusus*, the *Cerambycidae*; *Chrysomela multipunctata*, *Galerucella nymphaeae*, and *Haltica ignita*, the *Chrysomelidae*; *Upis ceramboides*, the *Tenebrionidae*; *Lepyryus colon* and *Pissodes affinis*, the *Curculionidae*; and *Xyloterus vittatus* representing the *Scolytidae*.

This is a poor list it must be confessed, but it is evident the specimens were picked up incidentally, and the order not worked as systematically as might have been, in fact the author practically says so, his directions being more particularly to get as complete collections as possible of the mammals and birds of the district.

COLEOPTERA.

Notes on the additions to the British List of Coleoptera since Canon Fowler's "Coleoptera of the British Isles."

By HORACE DONISTHORPE, F.Z.S., F.E.S.

(Continued from p. 138.)

Anisodactylus nemorivagus, Duft.—Champion records (*Ent. Mo. Mag.*, vol. xxxii., p. 253) this species as being taken at Woking and Chobham, at roots of heath in sandy places, by himself.

Amara famelica, Zimm.—Champion (*Ent. Mo. Mag.*, vol. xxxii., p. 97) notes this as taken at Woking and Chobham by himself, and at the former locality by Mr. Saunders.

Amara continua ab. *convexior*, Steph.—This aberration is added in the 1893 Catalogue. Fowler (*Col. Brit. Isles*, vol. i., p. 78) regards *convexior*, Steph., as a synonym of *continua*, Thoms., and Dr. Sharp, in his 1883 Catalogue, expresses doubtfully the same opinion. The last European Catalogue (1891) also treats it as a synonym of *continua*. Stephens (*Man.*, p. 37) describes *convexior* as follows:—"Rather convex, glossy blue-black above, thorax obsoletely punctured at the hinder angles, and with two obscure foveæ approximating to each other and to the margin; elytra, faintly striated; tibiae, red; antennæ, pitchy, with the three basal joints red. L. $3\frac{1}{2}$ l. London, Hertford, Norwich, &c. March-June." I have compared specimens of *A. convexior* in the Stephensian cabinet with *A. continua*. It is evidently a blue-black aberration of *A. continua*.

Tachys parvulus, Dj.—This species is placed under the doubtful species in the 1893 Catalogue. It must be reinstated, as Mr. Champion took it in some numbers at the base of cliffs, in sandy places kept moist by the percolation of fresh water from the high ground above, in Gerrans Bay, Cornwall (*Ent. Mo. Mag.*, vol. xxxiii., p. 213). Fowler (*Col. Brit. Isles*, vol. i., p. 98) records a single specimen that was taken by Mr. J. H. Smedley, at roots of *Parnassia palustris*, on the Wallasey sandhills, in September, 1884.

Bembidium virens, Gyll.—Champion (*Ent. Mo. Mag.*, vol. xxxi., p. 263) records this species as taken by himself and Mr. Lloyd, on the shores of Loch Maree, Rosshire.

Bembidium iricolor, Bedel.—Newbery (*Ent. Mo. Mag.*, vol. xxviii., p. 250, and *The British Naturalist*, 1893, p. 222), taken near brackish water, Rainham, Charlton, Sheerness, &c.

Hydroporus palustris ab. *tinctus*, Clark.—Dr. Clark described this species in the *Annals and Magazine of Natural History*, vol. x., p. 326,

and said:—"A variable species, nevertheless the four examples before me evidently represent a single species, which is abundantly distinct from all others with which I am acquainted; it will come next to *H. palustris*." Dr. Sharp ("Dytiscidae," p. 813) writes:—"I believe *H. tinctus*, Clark, is a var. of *H. palustris*, L., but it may possibly be *H. incognitus*, Sharp." In which case Clark's name has seven years priority. Fowler says (*Col. Brit. Isles*, vol. i., p. 182):—"Varieties of *H. palustris* occasionally occur in which the testaceous spots are almost, if not quite, obsolete, and the whole insect is of a reddish-fuscous colour. *H. tinctus*, Clark, is to be referred to one of these; the specimens from which it was described were taken by Turner in the New Forest." There are three specimens in the Power collection, including Clark's type. I think that this aberration ought to appear in the British list, it is in Crotch's two Catalogues, and in Rye's, but not in any of the others.

Agabus uliginosus ab. ♀ *dispar*, Bold.—Fowler (*Col. Brit. Isles*, vol. i., p. 192), under *Agabus uliginosus*, says:—"The dull variety of the female appears to be confined to Britain, it is not uncommon at Askham Bog;" and Dr. Sharp ("Dytiscidae," p. 507) writes:—"The female generally resembles the male in sculpture, but a form occurs rarely (? in Britain only) in which the upper surface in this sex is excessively, densely and finely reticulate, so as to be quite opaque." The form thus mentioned is the ab. ♀ *dispar*, Bold., described in the *Zoologist*, app. xxiv., 1849.

Platambus maculatus ab. *pulchellus*, Heer.—It appears to me from the evidence which I am about to discuss that this aberration is very doubtful, and would be best left out. *Agabus pulchellus*, Heer, is recorded in the *Ent. Annual*, 1857, p. 69, as having been captured by G. Wailes, near Loch Achray, on the north side of Loch Katrine, in September, 1853. E. Newman records in the *Zoologist*, 1856, p. 5,003, having received *A. pulchellus* from Mr. Wailes, and that he thought it was *A. maculatus*, but that no doubt such good observers as Heer and Wailes were right. He then goes on to say that the elytra are entirely dark and immaculate. This does not agree with Heer's description, as he distinctly states that the elytra are not immaculate. The description which may be found in *Fauna Coleopterum Helvetica*, 1841, p. 149, is as follows:—"Ovatus, subtus ferrugineus, supra niger, capite pronotique lateribus, elytris margine maculisque pallidis. L. $3\frac{1}{4}$ l." He goes on to say it is very like *A. maculatus*, but smaller in size and a little flatter, elytra with the three striæ on disc a little deeper; moreover, the colour of thorax and elytra differ. Dr. Sharp ("Dytiscidae," p. 549) says of *P. maculatus* that the smallest vars. come from Scotland, being dark and having the striæ on the elytra deeper. There is a specimen in the series of *Agabus maculatus* in the general collection in the Natural History Museum, South Kensington, labelled "*pulchellus*, Heer, Helvet., Kraatz." It is no smaller than the others, is bright and well marked. It is evident that when Dr. Sharp added the ab. *pulchellus*, Heer, to the 1893 Catalogue he had the small dark form in his mind, which is certainly not the *pulchellus*, Heer. I propose to call it ab. *immaculatus*, n. ab. Mr. Champion tells me he has two of this form, one from Braemar, taken by himself, and another from Loch Katrine, taken by Mr. Hislopp.

Hydrobius fuscipes ab. *aeneus*, Solier.—This aberration is another

addition in the 1893 Catalogue. Mr. Rye writes in the *Ent. Mo. Mag.*, vol. vii., p. 36:—"I have also in my collection a specimen of a var. of *H. fuscipes*, taken at Barnes, which I refer to the *H. aeneus*, Solier, conspicuous from its bright metallic green colour and bright legs (it is quite mature). Erichson (*Col.*, Mar. 1839) refers to this var., which seems identical with the prior *H. chalconatus* of Leach (1814) and Stephens, *Man.*" In Waterhouse's Catalogue (1861) *H. chalconatus*, Steph., is regarded as a synonym of *H. fuscipes*, L. Fowler says (*Col. Brit. Isles*, vol. i., p. 222):—"A variety (of *H. fuscipes*) occurs very rarely in which the upper surface is of a strongly metallic greenish, or bluish colour. In the series of *H. chalconatus* in Stephens' collection there are two specimens of a very blue-green tinge.

(To be concluded.)

HABITAT OF *TROGOPHLOEUS HALOPHILUS*.—For some years I have been in the habit of taking *Trogophloeus halophilus* at Hastings. About a third of the way up the cliff (which here is about 200ft. high) there is a sheer rock, down which the surplus water from above occasionally finds its way, leaving in places a crust of mud on the face of the cliff. This mud, which is composed of very finely comminuted particles, is chosen by the *Trogophloeus*. It drives little galleries through this, and is often accompanied by *Blodius atricapillus*. Its usual habitat is given as salt marshes. In the spring it is not uncommon, and a week or two ago I went to the locality accompanied by Mr. Donisthorpe, when we found a series in the very first little collection of mud scraped off and examined, much to the relief of my companion, who appeared to derive very little pleasure from collecting between the cliff and the Corporation stone-yard beneath, and whose expressions of satisfaction when we reached the bottom were apparently of the sincerest.—W. H. BENNETT, F.E.S., 15, Wellington Place, Hastings.

HABITS OF *PIMELIA BIPUNCTATA*.—Amongst the entomological features of Alassio was the occurrence, in considerable numbers, of the large black beetle, *Pimelia bipunctata*, one of the *Tenebrionidae*, on the sandy shore, where, at the east end of the bay, a portion forming a small sand-dune, rises to some height above high-water mark. This spot was also occupied by a large colony of *Pancratium maritimum*, a rather bold iris or lily-like plant, just coming into leaf. There was certainly some relationship between the plant and the beetle, but whether that extended to the larval state or no I cannot say. The sand had a short clothing of some *Medicago*-like plant, and, amongst this, seemed to be covered with chips of charcoal. These were really the seeds of the *Pancratium*, the black material being their outer covering of very light cellular material, adapting them, no doubt, to be blown about the sand by the wind or floated to fresh coasts by the sea. In a very hot sun the beetles were fairly active, but were often rather sluggish, and were then very difficult to distinguish, half-hidden under the trefoil, from the seeds of the plant. On several occasions they were seen to be eating the seeds. They had a habit of burying themselves in the sand, not for oviposition, for which they were not apparently mature, but for hiding. In doing this they scratched with their four front legs, and when sufficiently far in, pushed the sand out with their hind legs, coming backwards out of the hole to do so. On returning into the

hole they make use of their legs in a somewhat unusual order, viz., leaning over to one side and fixing the three legs of that side in the sand, they drive out the sand by a rapid action of the three legs of the other side, doing this alternately on either side, and advancing into the hole a short way at each alternation.—T. A. CHAPMAN, M.D., Betula, Reigate.

ORTHOPTERA.

Abbreviation of Wings in Orthoptera.

By MALCOLM BURR, F.Z.S., F.E.S.

(Included from p. 103.)

One effect of the abbreviation of wings is that the form of the pronotum is correspondingly changed. In earwigs, for instance, the hinder border is rounded in those species which have fully developed elytra and wings, whereas in the apterous forms the hinder border is straight, and often shows a few faint longitudinal sutures.

But it is in the *Phasmodea* that the abbreviation of the organs of flight is carried to the greatest extreme, while its effect upon the somites gives the systematist a most valuable character. In his great work on this group, published in 1859, Westwood divided the family into two sections, according as they had, or had not, organs of flight. A study of his plates will show at a glance that heterogeneous species are ranged in the same genus. But although the actual development, abortion, or absence of flight-organs is a useless character for the systematist, the form of what is known as the median segment is invaluable. On this point Brunner writes:—"What is usually regarded as the third segment of the thorax, is a close fusion of the metathorax with the first abdominal segment, and this first abdominal segment has received the name 'median segment.'" He goes on to show that the exact point of division is not always easy to see. Further, in the winged species the median segment encroaches considerably on the metanotum, with the result that the latter only occupies a third of the total length of the combined segment; while in the wingless forms, on the contrary, it is the median segment which only occupies a third of the total length of the combined segment. Therefore, by means of this character, it is possible to fix the apterous females of those species in which the males are winged, as the length of the segments is uniform in the two sexes. Again, species which have lost the flight-organs, can also be distinguished from completely apterous forms by this character, as they retain the relative lengths of the two segments. It follows that the form of this median segment affords us a character far more pregnant than the presence or absence of wings.

There is another point to notice in connection with the *Phasmodea*. In Orthoptera generally, it is usually the wings which decline, leaving the elytra. This, of course can be explained in the saltatorial groups by the retention of the latter for stridulating purposes in the male, whence they are transferred to the female. But in the *Phasmodea* the elytra go first, and are invariably smaller than the wings. In the *Aschiphasmidae* the elytra are reduced to tiny lobes, or even mere spines, while the wings, large and fanlike, extend the whole length of the abdomen. When closed they have no horny elytra to protect them,

so the anterior portion of the wings, instead of being soft, membranous, and coloured, like the rest of the organ, is hard, horny, and coriaceous, having the appearance of elytra. This part protects the delicate wings when in repose, and when extended has exactly the appearance of a long and narrow elytron. This is found in the majority, if not in all, of the winged *Phasmodea*.

We might, perhaps, have reasonably expected that in the *Mantodea* the abbreviation would have taken place in a manner similar to that of the *Phasmodea*, for they are not required for stridulation. But it is not so. I know of no case in the *Mantodea* where the wings are more developed than the elytra, much less where a part of the wings acts as false elytra.

Probably the most the *Phasmodea* ever do is to parachute from tree to tree, and the *Mantodea* seem to be unwilling flyers. In this latter group, as in almost all Orthoptera, we find that the flight-organs are more often abbreviated in the females than in the males. In *Fischeria*, *Ameles*, *Archimantis*, *Schizocephala*, *Oryophthalmus*, *Brunneria*, *Coptopteryx*, *Macromantis*, *Photina*, and others, they are developed in the male and abbreviated in the female.

We may, I think, make the following deductions with regard to this subject :—

- I.—In Orthoptera the development, abortion, or absence of elytra and wings, is very variable.
- II.—As the female is larger and heavier than the male, it is in the female that abbreviation occurs more frequently.
- III.—In the saltatorial sections part at least of the elytra of the male is often retained for stridulation.
- IV.—Corresponding rudiments may be transferred to the female.
- V.—In such cases the length of elytra is extremely variable.
- VI.—Usually the wings are abbreviated more than the elytra.
- VII.—In the *Phasmodea* the reverse is the case.
- VIII.—The comparative length of the elytra and wings in Orthoptera is absolutely untrustworthy as a systematic character.

PRACTICAL HINTS.

Field Work for Spring Months: June.

By J. W. TUTT, F.E.S.

1.—At the end of June, on the Clare coast, at Black Head, on the horizontal slabs of limestone at the very edge of the cliff, where nothing grows but a few stunted tussocks of grass and the rare *Adiantum capillus-reneris*, *Anthrocera nubigena* occurs in such countless thousands, that when I passed my net along the edge of the cliff it came back full of the moths (Hon. Emily Lawless).

2.—The male of *Heterogenea cruciata*, which is nearly black in colour, flies swiftly along the rides in Epping Forest, and is, in my experience, never beaten out (Battershell-Gill).

3.—*Ænistis quadra* is occasionally found spun up on trees, or on palings in the neighbourhood of trees, covered with lichens at the end of June.

4.—During the last fortnight of June (and in July) search *Verbas-cum* well for larvæ of *Cucullia lychnitis*.

5.—In June the larva of *Pseudoterpna cytisaria* feeds upon furze (*Ulex europæus*), *Genista anglica* and *Sarothamnus scoparius*.

6.—The larva of *Dyschorista upsilon* is sometimes to be found in the greatest profusion under the loose bark of willows in June.

7.—The second and third weeks in June are usually the most satisfactory in which to beat *Prunus spinosa* for larvæ of *Aleucis pictaria*.

8.—The larva of *Lithocolletis scopariella* makes an inflated mine along a broom twig. The pupæ should be obtained towards the end of June.

9.—In June the larvæ of *Spilonota rosaticolana* feed in shoots of rose, drawing together the leaves and eating out the young leaf-buds and flower-buds, and thus doing great damage in gardens.

10.—The larvæ of *Gonioloma auroguttella* feed in cones on *Hypericum perforatum* in June.

11.—The larvæ of *Larerna miscella* mine the leaves of *Helianthemum vulgare* in June.

12.—In the middle of June the larvæ of *Harpipteryx scabrella* may be beaten from hawthorn.

13.—The larva of *Ephippiphora grandaerana* feeds in June on *Tussilago* and makes very long curious tubes in the sand (Zeller). The imago also occurs in July and August among *Petasitis* in the Alps.

14.—The imago of *Semasia woerberiana* flies in the sunshine among laurel, cherry, and other fruit trees in June, and again in August.

15.—In June search for larvæ of *Cucullia chamomillæ* on *Matricaria*. They love to bask in the morning sun.

16.—In June collect the large bunches of oak leaves that are spun closely together, and have their central ones eaten and whitish; you will breed *Itholopha consociella*. If picked on high trees you will get *R. tumidella*, which feeds similarly, but not on bushes.

17.—Sugar often fails in dry and hot weather; flowers of grass, sedge, honey-dewed leaves, &c., should then be searched for Noctuids. I have often captured several score of Noctuids at sedge-blossoms on the Deal sandhills when the sugar has proved blank.

18.—The imagines of *Penthina sellana* fly swiftly by day about grassy banks, where *Centaurea nigra* grows, during June and July. It may easily be overlooked for a *Dicrorhampha*.

19.—The imagines of *Eupithecia rectangularata* are sometimes to be taken in great abundance flying round the apple trees at dusk, in June; also on the tree-trunks and adjacent fences by day.

20.—In June search in crevices or under the loose bark of willows and poplars for larvæ of *Catocala nupta*.

21.—Mullein plants should be searched in June for larvæ of *Cucullia verbasci*. The presence of the larvæ is readily shown by the turning back of the rough surface, and the larvæ are conspicuous enough if the leaves be turned over.

22.—In June the imagines of *Spilonota servillana* fly in the afternoon sunshine, and also at dusk among willow bushes in the south of England. The larva makes a swelling in the twigs of willows, turning to a pupa within the swelling thus formed.

N.B.—Similar series of "Hints" for this time of year are to be found in vol. x., pp. 151-153; vol. ix., pp. 152-153; vol. viii., pp. 116-118; vol. i., p. 117; &c.

NOTES ON COLLECTING, Etc.

ENDROMIS VERSICOLOR IN READING DISTRICT.—*Endromis versicolor* was first noticed on March 31st, when I took a male. On April 3rd I secured another male. The males fly till 3.20 p.m., and will do so without sun if the temperature be suitable. The largest batch of ova which has come under my notice numbered 188.—J. CLARKE, 26, Zinzan Street, Reading, May 2nd, 1899.

COLIAS EDUSA AT FOLKESTONE.—This morning I saw a ♂ *Colias edusa* flying in a meadow close to the town.—STUART G. HILLS, Public Library, Folkestone, May 5th, 1899.

FOOD-PLANTS OF TRICHIURA CRATAEGI.—*Trichiura crataegi* is only found on the moors in Aberdeenshire. The larvæ are essentially heather feeders, but, like *Saturnia paromia*, *Lasiocampa callunae*, *Orygia fascelina*, and most other heather feeders, they wander occasionally, and are to be found on bilberry and low sallow bushes growing on the moors. They readily take to hawthorn in confinement, but I have never known them to feed thereon in a wild state.—A. HORNE, F.E.S., Aberdeen, April 24th, 1899.

LATE APPEARANCE OF SPRING INSECTS.—So far insects in this district are quite a fortnight behind their usual time of appearance. *Micropteryx semipurpurella* is in good condition now (April 18th). Last year it appeared here at the end of March and was quite over by the middle of April.—E. A. ATMORE, F.E.S., King's Lynn.

There is little to report as to spring collecting; the nights have been so cold that I have only visited the salallows once this year, and insects are generally very backward. Larvæ of *Agrotis agathina* are very rare; I have only obtained about a dozen by hard sweeping where last year I took about 200, and could doubtless have taken many more had I wished. *Lasiocampa quercus*, too, are quite a month behind their usual stage, and I have only met so far one larva of *Harpipteryx nemorella*, on honeysuckle. These should be fullfed, but this was so small as to be hardly visible. So far I have seen only one *Cyaniris argyolus*.—E. F. C. STUDD, M.A., Oxtou, Exeter, May 4th, 1889.

SPRING LEPIDOPTERA NEAR RENNES.—As yet I have done but little field work. On May 10th, however, I went to the forest of Rennes, a locality for *Aglia tau* and *Papilio podalirius*. The latter is rare, and I saw but five examples. I am disposed to think that this species is inclined to disappear in Brittany, and although it is yet found a little to the west of Rennes, it has not been observed in the dept. of Finistère. I do not think it exists in the dept. of the Côtes-du-Nord. On the same day *Chrysophanus ranthe* was flying in the fields in the woods; of this species I was fortunate in obtaining a superb male, with the spots of the underside united into large black lines or rays. This aberration "*punctis nigris confluentibus*" occurs in *C. chryseis* very frequently in the forest of Compiègne in the middle of June. *Anthrocera palustris* has not yet put in an appearance. The season appears late for lepidoptera in Brittany. In a few days, however, *Melitaea didyma* and *M. parthenie* ought to be on the wing. The latter gives here some fine aberrations. I have been rearing a brood of red *Callimorpha hera*, which I took at Cancale, in my garden. I have so far 29 larvæ which appear to be fullfed. As *C. hera* ab. *lutescens* and ab. *saturnina*, as well as the red form, fly together in the same locality, I

shall be interested to see whether the eggs from a red female will produce the other aberrations of colour. The ab. *lutescens* gives both red and yellow forms, never yellow only.—C. OBERTHÜR, F.E.S., Rennes, May 12th, 1889.

DEILEPHILA LIVORNICA IN THE ISLE OF MAN.—A magnificent specimen of the rare *Deilephila livornica* was captured last night on Douglas Head by Mr. William Garrett, of No. 17, South Quay, Douglas, who brought the insect to me alive to-day. The specimen measures 8½ in. across the wings from tip to tip, and was netted by Mr. Garrett whilst hovering over flowers of *Silene maritima*. Mr. Garrett also captured specimens of *Dianthocia capsophila* and *Eupithecia venosata* on the 7th and *D. caesia* on the 8th inst. This is exceptionally early, as the cold winds experienced here for some time past have kept back vegetation very much.—H. SHORTRIDGE CLARKE, F.E.S., Sulby Parsonage, Isle of Man, May 13th, 1899.

SCIENTIFIC NOTES.

CRITICAL NOTE ON *SOLENOBIA TRIQUETRELLA*.—In the *Ent. Mo. Mag.*, xxxi., p. 164, Mr. C. G. Barrett writes: "It may be desirable to point out that the species named *S. triquetrella* by Fischer von Rösslerstamm cannot well be that referred to above, nor indeed a member of the present genus (*Solenobia*) since it is described as having pectinated antennæ. Probably it represents one of the species of *Epichnopteryx* among the *Psychidae*." This is not quite inaccurate, but at the same time essentially misleading. What Fischer von Rösslerstamm does say is this: "The antennæ are grey-brown with very fine and light pectinations." This is absolutely correct, and so depicted by Fischer von Rösslerstamm. There can be no doubt, and we state this emphatically, that Fischer von Rösslerstamm was an entomological artist of the first rank, his life-histories are perfect, as also are his figures, except where, as in this, the paint has with age played him (and most other entomological artists) false, but even now his figure under a lens is good enough to see the characteristic Solenobiid specklings and the details of the larva and pupa and imaginal antennæ leave no doubt whatever that Fischer von Rösslerstamm's *S. triquetrella* is exactly what he calls it. We suspect that Mr. Barrett took his information about Fischer at second-hand, and that he has not examined the antennæ of the male Solenobiids with any higher power than a hand-lens, a mode hardly likely to have been adopted by Fischer, who saw the Solenobiid pectinations, the non-existence of which Mr. Barrett implies. Mr. Barrett does Fischer less than justice in supposing that he figured an *Epichnopteryx* for a *Solenobia*. We would suggest that some of Fischer's plates are worth examination by those interested in the artistic side of our study.—J. W. TUTT.

COLOUR CHANGE IN *SCOLIOPTERYX* LARVA.—Dr. Chapman's remarks (*Ent. Rec.*, xi., 76) somewhat obscure the point that I wished to make about the function of the black coloration assumed before pupation. The facts simply are that the cocoon, though closely woven and covered with leaves, is open at the end and the larva is visible from that point; the black colour is also visible, though it does not obtain over the whole of the exposed portion of the larva. Finally, as the larva is in what is virtually a tube of leaves, the black, rather than

green, serves to conceal it as causing it to harmonise with the dark interior and appear unlike a living larva. If this black pigment is an inevitable result of the pupal coloration, why do not all larvæ that have black pupæ show it? And if a definite development of pigment never occurs for the prepupal period, how will Dr. Chapman explain the coloration of *Polygrammate hebraicum* to which I referred? (See, *Proc. U.S. Natl. Mus.*, xxxi., 9, for description of this larva.)—HARRISON G. DYAR, Ph.D., United States Nat. Museum, Washington.

COPULATION OF *DRYAS PAPHIA* AND *POLYOMMATUS CORYDON*.—I confirmed an observation, first made at Mendel Pass, when out collecting at Pré St. Didier on August 10th, 1893, to the effect that the male *Dryas paphia*, although so much the smaller and apparently weaker of the sexes, carries the female if they be disturbed whilst paired. The male of *Polyommatus corydon* also carries the female under similar conditions. On the other hand, I have a recollection (that wants confirming) that the female *Melitaea didyma* carries the male.—J. W. TUTT.

THE ANAL ARMATURE OF THE SOLENOBIID PUPA.—I have recently been examining the pupæ of certain Micro-Psychids and have also been reading up such information as I can find bearing on their structure. I see that Packard notes (*Bombycine Moths of America*, p. 67), the two small terminal anal spines of *Taleporia pseudobombycella* and considers that they may be the homologues of the anal-leg hooks of the pupæ of *Psychidae*. In his note on the pupa of *Solenobia walshella* he states (p. 69) that "in this genus the abdomen has no cremaster and no terminal hooked spines, the pupa in exuviation being fastened to the sides of the cocoon by numerous hooked setæ." He also figures these well-known recurved setæ in his fig. 26A (p. 69) which represents the terminal segments of *S. walshella*. It is quite clear, even if the statement is true of this species, that the generalisation is altogether incorrect, and I have now before me two lots of living Solenobiid pupæ (*Solenobia inconspicua*) collected by Mr. Hamm during the last few days in which the dorso-lateral anal spikes or spines are very conspicuous, as also are the characteristic long setæ, each with its strong recurved hook. It would be well to examine the Solenobiid pupæ very carefully to see whether the pupæ of the American species are really wanting in these structures.—*Ibid*, April 14th, 1899.

CURRENT NOTES.

Mr. Banks gives (*F. M. M.*) a description of the larva and pupa of *Cnephasia sinuana*, Stphs. He notes that the larva lives in a loose silken web spun among the flowers of *Scilla nutans*, feeding on the flowers themselves and also on the green unripe seeds, and occasionally in confinement nibbling the stalk. . . . The pupæ were enclosed in slight, loose, white silken cocoons, spun in confinement among the flowers and stems of the wild hyacinths."

Mr. R. C. L. Perkins adds (*F. M. M.*) *Craebro planifrons*, Thoms, to the British list, and compares it critically with *C. cephalotes*. It appears to be larger than the latter, and the pilosity of the clypeus seems to be normally golden in the latter, silvery in the former, which also generally has the mesothorax less distinctly strigose.

Mr. Banks asserts (*Entom.*), on the authority of the Rev. O. P. Cambridge, that the late Mr. F. Bond, who gave Stainton the locality

of "Blandford" for certain species in the *Manual*, was never there in his life, and that the whole of the records for "Blandford" refer to Bloxworth, a place seven miles distant as the crow flies. This error appears to have been knowingly propagated for "strategical reasons." In the same way the locality referred to in general terms in the *Manual* as the "New Forest" is said to refer to Ringwood.

Mr. Arkle says (*Entom.*) that there is "a form of the larva of *Tephrosia crepuscularia* (*histortata*) = *T. bimbularia*" that is "inky-black, except for the pale blotch above and upon the claspers of segment 10." One would like to know what insect Mr. Arkle refers to by this marvellous synonymy, possibly, we take it, *Tephrosia crepuscularia* (= *bimbularia*) and not *Tephrosia histortata*, Göze, at all, as he refers to an expectation of breeding the black form. Which, too, is the "10th segment" of the larva? The head contains possibly four segments, the thorax three, so that the 10th would be about the third abdominal. Why not eliminate a communication that no one can possibly understand!!

Mr. Morley records (*E. M. M.*) *Ptinus germanus*, F., in some numbers in Suffolk in April last. Mr. Champion records having taken *Hypophloeus linearis*, F., at Woking. It will be remembered this insect was first discovered last year in Britain by Mr. H. Heasler at Oxshott. Mr. J. H. Keys records having taken the rare *Quedius longicornis*, near Plymouth, in July, 1896.

At the meeting of the Ent. Soc. of London, May 3rd, 1899, Mr. Enock exhibited a living example of the remarkable aquatic Hymenopteron—*Prestrichia aquatica*, Lubb., and said it was one of a brood of nine, including 8 ♀♀ and 1 ♂, that issued on May 1st from a single egg of *Colymbetes* found on September 5th, 1898. At the same meeting Mr. Merrifield showed some specimens of *Humaris bombyliiformis*, Esp., with the scales still covering the central portions of the wings. He said that these scales, which are present immediately after the emergence of the insect but soon become detached, may be rendered adherent by allowing a very weak solution of indiarubber in benzoline to run over the wings.

A series of papers on the Hemiptera collected by the veteran entomologist, J. W. Douglas, has just been presented to the Library of the Ent. Soc. of London by Mr. McLachlan. The collection contains not only printed but MS. copies of rare papers, not otherwise obtainable. The papers make altogether 14 volumes of considerable size.

ERRATA.—Page 37, line 14 from bottom and bottom line, also p. 39, line 14 from bottom, for "*Trypeta*" read "*Carpocapsa*."—E. REITER. [We have to apologise to Professor Reuter for these blunders, which were due to our ignorance of *Trypeta pomonella*, Walsh, being a dipterous insect, and the assumption (altogether unwarranted) that the author was using a synonymy different from that in use in Britain. The insect *Trypeta pomonella*, Walsh, is referred to in its proper connection p. 38, line 5. In the other cases mentioned, *Carpocapsa pomonella*, L., should be read for *Trypeta pomonella*.]

Page 107. Hint 24.—Delete "feeding." [*Coleophora thetinella* larvæ are full-fed in September-October, hibernate full-fed, pupate in May, emerge in June and July; in England found on *Cnicus arvensis*. Sorhagen records it also from *C. palustris*, *Carduus nutans*, and *Carlina vulgaris*.—E. R. BANKES.]

Page 108. Hint 28.—For "*instabilella*" read "*plantaginella*." [*Gelechia* (*Lita*) *instabilella* feeds in leaves of *Atriplex portulacoides* only, is full-fed in April, when it wanders away for pupation. The larva of *G. plantaginella* feeds in roots of sea-pplantain, although it can be obtained much more easily in root-stocks of *Plantago cornutus* than of *P. maritima* (vide, *E. M. M.*, 2nd ser., v., p. 82).—E. R. BANKES.]

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The Lepidoptera of St. Michel-de-Maurienne.

By J. W. TUTT, F.E.S.

When one has, like the writer, waded through miles of magazines to obtain recorded localities and the dates of appearance of various species of Lepidoptera, a feeling arises that one ought, at whatever inconvenience, to at least publish a list of the insects observed or captured in an unexplored or little known district. The exigences of other entomological work and the want of magazine space have hitherto kept me from compiling a list of the insects observed at St. Michel-de-Maurienne, and only the necessity of removing some of my captures to other quarters has at last compelled me to give the following list of the Lepidoptera observed (1) on a single day, in late July, 1896, when I walked up the zigzags behind the diligence from the little town of St. Michel to Valloire, and (2) for eight days, in late July and early August, 1897, when I selected St. Michel as a likely place to produce some interesting species for the cabinet, without involving too much labour in the getting. I must own I was just a little disappointed, for although I obtained good series of several fairly common low-level butterflies, presenting forms not altogether similar to our own, and made, too, several observations on the Heterocerous fauna, yet the sum total was not altogether satisfactory in the number of species captured. I may add that I was so far unable to do any serious entomological work at my second and longer visit that I confined my attention entirely to the lower slopes in the neighbourhood of the town.

The town itself has an elevation of about 2,200ft., is situated on the right bank of the Arc, and is dominated on the north by the Perron des Encombres (2,828m.) and although the town is not very attractive, the picturesqueness of its surroundings is undeniable. All the express trains to Modane stop here, and a diligence meets the morning express (arriving from Paris at about 9.30 a.m.) to take tourists to Le Lautaret *via* the Col du Galibier, an entomological locality made historical by the researches of Boisduval and others now almost three-quarters of a century ago.

Among the Rhopalocera obtained were *Papilio polalirius*, abundant in the roads, the males yellow and the females white in colour; *Papilio machaon* abundant in the clover and lucerne fields, whilst *Par-nassius apollo* cf large size increased in numbers continually as one went up the mountains. Among the Pierids, *Aporia crataegi* was not yet over, whilst *Pieris napi* ab. *napeus*, its pupæ hidden in crannies

in the walls, was abundant, and the imagines had scarcely any traces of the normal green veins on the undersides of the hind-wings. *Pieris rapae* were small, and *Pieris brassicae* scarcely ever observed. On the other hand, the shady corners produced *Leucothasia sinapis* var. *littoralis* in some abundance, the ab. *erysimi*, however, being distinctly rare. *Gonepteryx rhamni* and *Colias edusa*, without being really abundant, were everywhere, whilst, in much greater numbers, males of *Colias hyale* flew over the fields and careered along the steep slopes, the females favouring the stubble-fields, and laying their eggs on the young clover showing there. In the stubble-fields, too, *Brenthis didactyla* were there were literally hundreds of examples of this remarkably small second brood, the females laying their eggs on the small wild heart's-ease plants that were growing there. *Brenthis ino* was represented by a few very worn examples, one of which, however, gave me an egg, described *ante*, vol. x., p. 16. *Dryas paphia* was going over, but the var. *ralesina* was occasionally seen with the type; *Argynnis adippe* was in better condition, and some fine large and fresh females were observed, whilst *A. aglaja* was distinctly rare. *A. lathonia*, however, was in the finest possible condition, and in considerable abundance where the lucerne grew in great bushes on steep banks as hard as ironstone, and from which one could not suspect the plants could obtain an atom of nourishment. There, too, was *Hipparchia aleyone*, easier to catch than on the roadsides where it feasted on the faeces, but was even then too wary to let one come often within striking distance. When disturbed it rested on the trunks of the trees and was most difficult to locate exactly. *Hipparchia semele*, too, strangely enough, was more abundant on the lucerne blossoms than in its normal habitat among the rocks; *Satyrus cordula*, was practically over, although one or two fine females fell to the net, whilst *Melanargia galathea*, in all sorts of condition, from ladies fresh as paint to females worn and tattered, were almost everywhere, about as dark, though, as most specimens of this species are in the lower mountain valleys, i.e., as dark as the darkest specimens obtainable as aberrations in the south of England. *Pararge maera* had another brood out, and *P. megera* darted swiftly to and fro with its larger relative. *Epinephelus lycaon* and *E. ianira* were almost equally common, the odds, however, slightly in favour of the latter, whilst *Coenonympha pamphilus* was usually met with on waste grassy places and with a tendency to the ab. *ocellata*. Some spots were found where the beautiful *Chrysophanus virganeus* abounded, some of the females, with extra spots within the normal transverse series crossing the fore-wings, being very fine. They were much brighter than the females obtained at Cogné, but *C. hippothoe* was evidently rare here (or over), whilst large *C. phlacas*, and its abs. *suffusa* and *caeruleopunctata* were none too abundant. The "blue" of these mountains is *Polymnatus damon*. There is a piece of waste ground through which the zigzags wind, at about 1,000ft. elevation behind the town, on which, as the sun becomes hidden by the giant peak above, they sit in countless myriads, dispersing during the daytime to crowd about the runlets that trickle here, there, and everywhere. Only less abundant is *P. coridon* at this elevation, whilst it altogether outnumbers *P. damon* nearer the town. *P. icarus* is not very common, nor is *P. astrarche*, inclining to var. *alpina*, whilst *Nomia semiauriga* is not rare. *Cyaniris argiolor*, as usual, is only occasionally captured

as it hurries by from one clump of trees to another, and *Plebeius agyon* appeared to be restricted to one or two of the roadside banks, at a fair elevation, and was possibly over in the lower levels. Of the Erebiids only *Erebia ligea* appears to haunt the slopes of the woods up towards the little tunnel leading through into the valley in which Valloire is situated, whilst *Limenitis camilla*, of rather larger size than usual, *Polygonia c-album*, *Pyramis atalanta*, *P. cardui*, *Aglais urticae*, and *Vaessaia* appeared to be generally distributed. On the piece of ground, on which *P. damon* was so abundant, pigmy *Thymelicus lineola* were also in swarms, very worn, and quite too difficult to pick over for a few good examples. *Pamphila comma*, chiefly ab. *catena*, was abundant, whilst *P. sylvarum* was much less so. *Syrichthys sae* was observed, as also *Spilothyrus alceae*, large and well coloured, the latter, however, not at all common. A few worn *Thecla spini*, a single male specimen of *Chrysophanus dorilis*, a very large and newly-emerged *Polymnatus orion*, a female *P. meleager*, with scarcely a trace of blue on the upper side, and the discoidal spots ringed with white, appear to include most of the chance captures among the Rhopalocera.

Among the moths, which were distinctly more interesting, the palm must be given to *Callimorpha hera*, which was very abundant on all the lower slopes, wary when disturbed, utterly oblivious to its surroundings when on a flower-head in the hottest sun, and impossible to get home in really fine condition even if the wings were hardly dry when captured. The beautiful *Anthracera ephialtes* occurred sparingly, but I could not hit on its head-quarters nor could I get eggs. *A. loniceræ* was abundant higher up in the wooded parts, as also *A. transalpina*. About the clover fields *Acontia luctuosa* was in bewildering abundance, evidently a second brood (the insect had not been uncommon the preceding June in North Kent), and *Macroglossa fuciformis* now and again came fussily to feed, and fell a victim to its appetite. *Heliothis dipsacæ* was rather rare, perhaps not a dozen observed, but *Agrophila trabealis* was disturbed almost everywhere in the stubble-fields just behind the town and around the little church. In these, too, *Lythria purpuraria* started up at almost every step, and, although several were boxed, scarcely one specimen in a dozen reached the killing-tin in decent condition. These were very large and fine, the males with strongly-marked purple bands, the females with scarcely a trace of these on them. One afternoon, as I was returning rather late, between 5 and 6 p.m., through a piece of meadow land, quite close to the town, I captured more than a score of *Emmelesia blanda*, much to my astonishment, as they flew about in very business-like fashion from one part of the meadow to another at some 5ft. or 6ft. from the ground. *Taraxacampa pastinum* was kicked up one afternoon and netted, whilst amongst other species observed in more or less abundance were the following:—*Enclidia glyphica*, *Ortholitha bipunctaria*, *Acidalia rusticata*, *A. humiliata*, *A. rubiginata (rubricata)*, *A. ornata*, *A. immolata*, *A. rufaria*, *Crambus culmellus*, *C. perlatus*, *C. pinetellus*, ? *C. tristellus* (very strongly marked if this species), *Hythia carnella*, *Eubulea sambucalis*, *Cleobolia angustalis*, *Stenopteryx noctuella (hybridalis)*, *Rhodaria sanguinalis*, *Pterophorus monodactyla*, *Acipitilia pentadactyla*, *Oxyptilus pilosellus*, *Mimaneptilus zophodactylus (boewii)*, *M. plagiodactylus*, and *M. coprodactylus*. It looked strange to see the late examples of *Melanippe venturata* flying with the above, whilst *M. sociata*, *Min*

murinata, and *Ematurga atomaria*, large and yellow, very like our Cuxton chalk-hill form, had evidently reached second broods; *M. tristata*, too, could be disturbed from the bushes fairly high up, whilst *Aspilates gilvaria* was frequent. *Miana strigilis* was now and again disturbed from a flower-head, having the habit that one often observes with *M. furuncula* on the Kent coast and elsewhere, of basking in the afternoon sun. *Lithosia lutarella* was hardly so golden-yellow as usual, but still had not reached typical *L. pygmaea*, as it has at Bourg d'Oisans, on the other side of this mass of mountains. All the Setinas seen were possibly *S. aurita*, strongly streaked as usual. The Tineids and Tortricids were positively absent, except for several *Xanthosetia zeyana*, an odd *Tortrix gilvana*, a few *Catoptria* sp. (?), and *Dichrorhampha alpina* (?), whilst a single *Gelechia turnioidella* appears to complete the bag.

On the relationship of the Lepidopterous pupa to its larva.

By A. BACOT.

The following notes have been suggested by some questions which Mr. Tutt has submitted to me concerning the position of the hair-tufts in certain Lymantriid (Liparid) pupæ and their relation to the hair-tufts of the larva. The consideration of these hairs and the facts of their position and structure raise some difficult questions with regard to the theories bearing on the relation that the pupa bears to its larva.

I quite agree that the pupa must be considered as a separate and independent structure apart from the larva or imago. Of course, except as regards special, and probably more recent, developments, the pupa is much more ancestral than either the larva or imago.

According to Weismann's theory of the mechanism which is present in the germ-plasm of a lepidopterous insect (the only theory with which I am sufficiently well acquainted to make use) we ought to have four more or less distinct sets of determinants present, A—for the egg, B—for the larva, C—for the pupa, D—for the imago. Theoretically A and C should contain the oldest or most primitive determinants. [Of course very old ancestral determinants such as produce the development of sexual organs in the pupa, would be mixed with newer ones (later developments), such as those accountable for the anal armature (cremaster). These last-mentioned might possibly be far more recent than those producing larval or imaginal characters, while the former would be necessarily much older than any imaginal characters, and probably than many larval ones.] Determinants A and D, for the purposes of the present argument, may be dismissed. According to the theory, setting aside scars and similar mere moulded or accidental characters, where a character is common to larva and pupa (I am speaking here of characters of the pupal-case only, not of its contents, as similarities of colour and pattern are due to the pupal contents), it should be either an entirely independent development in both, or else it must be considered older, phylogenetically, in the pupa than in the larva. Hence it follows that, if the tubercles and hairs on the larva undergo alteration of structure or position, it by no means follows that the pupal ones would be altered also. We ought, in fact, to find the ancestral arrangement present in the pupa, in spite of an alteration being present in the larva.

In a caddis-fly larva the metathorax bears four dorsal plates, set in trapezoidal form (there are also traces of trapezoidal groups on head,

pro- and mesothorax, though there are other hairs present as well) each bearing many hairs; but I can only trace two small dorsal hairs on each abdominal segment. The arrangement on the metathorax is suggestive that the Lepidoptera may have received the primitive arrangement of tubercles from an ancestor common to the Lepidoptera and Trichoptera. If this assumption were correct the arrangement on the lepidopterous pupa should follow the trapezoidal plan independently of the larva. In Macro-Psychid larvæ the larval tubercles are reversed as to position, the base of the trapezoid being towards the head and the smaller end towards the anus, and this is the case in the pupa also. This fact would appear to suggest that the determinants which produce the pupal characters are influenced by the more recent larval ones!

In the Liparids, belonging to a much more specialised family, we find that the pupal hairs (? rather an uncommon feature for so specialised a group) follow the position of the larval tufts, or tubercles (*i.e.*, where we get a tuft in the larva we get a tuft, or something approaching one, in the pupa). This would seem to support the former suggestion, but when we come to the hairs themselves a new feature is apparent. The pupal hairs differ in structure from those of the larva. In the Liparid larvæ that I have examined all the larval hairs (so far as my knowledge extends) are thorny, branched, or plumose, and circular in section, while the pupal hairs are (with three exceptions to be noted later), without thorns or branches, and are frequently flat or ribbon-like. In *Notolophus antiqua* and *N. gonostigma*, the situation of the larval dorsal tufts is occupied in the pupa by structures which are not hairs at all in the usual sense of the word, although they may be homologous in a physiological sense. The three exceptions to be noted are as follows:—*Lymantria* and *Porthetria*, in both of which the pupal hairs are thorny, whilst *Leucoma salicis* also has a few of its hairs of this character. These pupæ are, however, greatly exposed. In the case of *L. monacha* and *P. dispar*, they are suspended in a slight silken hammock, while the cocoon of *L. salicis* is often very slight.

The pupæ of *Porthesia auriflua* and *P. chrysorrhoea* are well protected by the irritating larval hairs in the cocoon, and we find these pupæ are less hairy than those of the other Liparids. The above facts appear to point to the pupal hairs of the Liparids having a special and independent development, quite apart from those of the larva, only we must not forget that *Dasychira fascelina*, which has the stoutest cocoon of any of the British species, is the most hairy of all, and, further, that we have still the position or arrangement, so similar to that of the larva, to account for.

Is the stimulus (if any) of the position of a tubercle or tuft in the larval skin sufficient to determine where on the pupa the independent or ancestral pupal hairs shall develop, or must we look for an explanation to a (?) possible mixing of larval determinants with the pupal ones, and, if so, what prevents imaginal ones from doing the same? Or, finally, are we to consider the pupal envelope a hybrid structure, partly ancestral imaginal and partly modern larval?

Critical notes on a Solenobia from near Reading.

By J. W. TUTT, F.E.S.

I have recently been at work on the *Solenobiae*, and have had to critically review the literature thereof. As I shall have to disagree on

many points of importance with the results arrived at by various workers, and such points of disagreement are not altogether best dealt with in a work in which results are chronicled rather than criticisms indulged in; a little magazine space may perhaps be occupied in the attempt to clear up any misconceptions that appear to have arisen, with a view to obtaining outside criticism as much as to suggest that any final conclusion has been reached.

In the *Ent. Mo. Mag.*, xxviii., p. 127, Mr. Barrett gives an account of various forms of *Solenobia*, among others, an account of one which Mr. Hamm sent him from the neighbourhood of Reading, and to this was appended a note from Lord Walsingham, whilst the account itself contained an important quotation from a letter sent by Dr. Chapman. Knowing that I was working at this group Mr. Hamm collected and sent me a plentiful supply of cases, not only from the 1897 locality, but also from a second colony at a little distance. Considerable superficial difference was observable in these cases, those from the first locality, an old tarred fence, now more or less lichen-covered, being dark in colour: those from the second, an old untarred fence, also lichen-covered, being much paler. Still, in spite of this general difference, and in spite of some variation in the cases, *inter se*, some examples from the two batches were practically identical. I bred some females, took descriptions of the egg, &c., and, having finished with them, handed the cases over to Dr. Chapman.

It would appear (*loc. cit.*, pp. 127-129) that there was a tendency to consider the Reading species distinct from *S. inconspicua*, as known near London and in Lancashire, on the following grounds:—

- 1.—The different form of the case compared with that of *S. inconspicua*, from (I believe) Prestwich Wood (Chapman).
- 2.—The cases coal-black in colour (Barrett).
- 3.—The ♂ with two more joints in the antenna than in that of the ♀ of *S. inconspicua* (Chapman).
- 4.—The extent to which the ovipositor was protruded in the dead ♀ (Barrett).
- 5.—The absence of the broad, white, satiny patch of scales (Barrett).
- 6.—The dark colour of the ♀—"the whole surface darker" (Barrett); the female blacker than *S. pineti* (Walsingham).

With the cases and females before me I made the following notes:—

1 and 2.—The cases vary in shape, some rounder, some more trigonal in section. Barrett's note that they are "coal-black" will not apply to more than one or two in ten. Both lots of cases vary much in tint, those from the once tarred fence distinctly darker on the whole.

3.—The antennæ not dealt with. [With more abundant material, Dr. Chapman informs me that the Reading specimens are identical with *S. inconspicua* in this respect.]

4.—The ovipositor in the living insect is a grand one, and works marvellously. Is it worth while discussing the distance it is left protruding in dead specimens?

5.—This is the most serious point, because, if true, one would have accepted the insect, without doubt as a distinct species. One can only suppose Barrett must have had females that had laid their eggs and used the white satiny down, when he says that they have none. The patch in the Reading females is splendidly developed, and the way in which the little cavity is filled to overflowing with this white silky material, which she afterwards deposits with her eggs, is quite remarkable in a newly-emerged female.

6.—The living female is certainly not black. It is yellow in colour, with fine black lines (? hairs) on the outer edges of the dorsum of the abdominal segments. These lines (? hairs), give a very peculiar effect when seen through the pupal skin, just before an insect is about to emerge. Dried specimens, previously more or less

pent by egg-laying may be black. It is possible that this ♀ is darker than the ♂ *pineti*. I do not know the latter.

There can be little doubt that, in every point relied upon by Mr. Barrett to separate the insect from *S. inconspicuellæ*, it agrees with the latter absolutely.

Classification of the Acronyctas.*

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

The true Acronyctas have always had attached to them by different systematists a number of other species and genera. With the appearance of the work of Smith and Dyar I think there need be no difficulty in cutting them all adrift. Both authors reject *Craniophora ligustri*, hitherto regarded as the nearest of these. Professor Smith retains the *Pantheini*, apparently out of respect to tradition and Dr. Dyar, but all Dr. Dyar says in defence of the position is, that "four larvæ are known which have nearly the same characters as Acronyctids." The eggs, pupæ, newly-hatched larvæ and imagines, all deny any such association, and certainly suggest a relationship with the *Liparidæ*. Instead of keeping them with Acronyctids, as a sub-family, they would be much more at home as a sub-family of *Liparidæ*, distinguished chiefly by not having larval glands. Smith and Dyar appear to know the eggs of only one Pantheid. Curiously, as to one genus, *Harrismennæ*, Professor Smith makes it an Acronyctid, whilst Dr. Dyar calls it a Pantheid. It is impossible to accept Dr. Smith's suggestion that it has Bryophilid affinities, and I should, from figures, rather suggest *Agaristidæ* as denoting its position. Unfortunately I am unacquainted with its early stages, but the larva is stated to have one remarkable peculiarity that is new to me, and is not referred to by Dr. Packard in the *Triode*, where it is figured. At each moult the cast head remains attached, and the full-grown larva has a whole string of cast heads, which it wags from side to side when disturbed. Is it this larva or the rattlesnake that is the mimic?

This practically cuts down the true Acronyctas to my *Viminias* and *Cuspidias*, which remain undisturbed as two very distinct groups, the former very homogeneous compared with the latter, which is divisible in various ways. Dr. Dyar makes three groups on adult larvæ, Professor Smith four groups by male genitalia, Professor Grote makes two genera and nine sub-genera. All, however, are agreed as to one of these groups, *viz.*, that for which Grote finds *Apatela*, Hb., to be the correct name, called by Dyar and Smith the "*Americana*" group—*americana* being the American species they take to represent it. It contains our English *aceris* and *leporina*. The remainder fall into Grote's *Hyboma*, Hb., and as Smith and Dyar divide these differently, Smith into three and Dyar into two, and as Dyar's second group contains species from each of Smith's three groups, we must regard this group as not yet satisfactorily divisible.†

For purposes of classification *Viminia* and *Cuspidia* are of equal

* "A revision of the species of Acronycta (Ochsenheimer) and of certain allied genera," by John B. Smith, D.Sc., and Harrison G. Dyar, Ph.D., pp. 194, pl. 29.

† "Die Apateliden," von A. Radcliffe Grote, M.A., 4to., pp. 18, pl. 2."

† I hear from Dr. Dyar that further information has led to an agreement as to the subdivisions of *Hyboma*.—T.A.C.

value or weight; Grote's two genera of *Cuspidia* are again of equal weight, viz., his *Apatela* and *Hyboma*. The subdivision of *Hyboma* is, therefore, of minor importance, though, as it contains a large number of species, it might be convenient. The distinction between *Apatela* and *Hyboma* that is most fundamental, is, that the tubercles in *Hyboma*, in first stage, are all simple, in *Apatela* the anterior trapezoidals (i of Dyar) have more than one hair. (In *Viminia* all tubercles are multiple-haired.)

Hyboma contains very varied forms both in larva, pupa, and imago; unfortunately the several stages, so far as is known, do not all point to similar subdivisions. As Dr. Dyar's divisions are based on adult larvæ, I do not incline to consider them of equal value to Smith's, based on appendages; but, again, though there are several types of appendages in *Hyboma*, all are not sharply defined from each other. In one case there is a very definite form, viz., that represented by our English *megacephala*, which, at first sight, will not fall into line with anything else in the genus, nor does it really; still, it may be derived from them if we suppose the harpe to be strongly developed and the valve atrophied. Setting this aside, our other English species all fall into one group, having the harpe with three processes or spines more or less evident. From this type, variation occurs in three directions (still within the genus *Hyboma*), into groups not represented in Europe. One has the second spine largely developed and directed backwards and the valve narrowed so as to be above the harpe. This includes 17 or 20 species, of which one is *lobeliae*. Another has the third spine developed downwards like a chin (*Tricholonche* of Grote, *persuasa* of Smith), and the other (*Lepitoreuma* of Grote, *hamamelis* of Smith) has apparently the second spine alone developed and situated on the middle of the valve, but some of these have the appendages as sharply defined from each other by the absence of intermediate forms as are those of the *Apatela* and the *Viminia* (*Pharetra*) groups. In each of these only the first spine or process is well developed, standing up as a horn from the centre of the valve. In *Viminia* this has a fairly large chitinous base representing the other spines and the rest of the harpe, and it has a marked curve backwards. In *Apatela* the chitinous base is less abundant, and the curve is forwards. In Professor Dyar's drawings, those of *felina* and *frigida* seem to belong rather to *Viminia* (*auricoma*) than to *Apatela* (*americana*); this is probably an error in judging from drawings only. *Alborensa* is retained by Professor Smith in a separate genus on no other ground than its coloration; a slightly weaker tongue than some *Viminia*, but hardly than others, being the only structural character suggested. This is hardly satisfactory after a condemnation of Grote's work as "based upon superficial appearance and resemblance, and not upon structure or other characters of real systematic value." I am not sufficiently informed as to the American species to say whether Grote has or has not misplaced one or two species, but it is certain that his primary divisions into *Apatela*, *Pharetra*, and *Hyboma*, and the sub-divisions of the latter into *Tricholonche* (*persuasa*), *Lepitoreuma* (*hamamelis*), *Cuspidia* (*megacephala*), *Hyboma*, *Triaena* and *Jocheaera* (*lobeliae*) appear to me to be precisely those that Dr. Smith finds himself forced to adopt, and it is doubtful whether we shall get any further till the life-histories of the American species are more fully described. Of the 74 species

A Tabulation of Grote's and Smith's Classifications of Acronycta, with some of their characters added.

| Группа. | Смита's Groups. | Группа. | Тип. | English sp. | American Repres. | Newly-hatched larvae | Роды. | ♂ Appendages. |
|-----------------|-----------------|--------------|--------------|-------------------------------|------------------------|----------------------|----------------------------|--|
| НУЛОМА, Hb. | Lobelina | Triacena | psi | psi, tridens | occidentalis, lobeline | 6 and 7 pale | Cuspidia | a. Several spines recognisable, typically 8, if one directed backwards it is 9rd. |
| | | Hyboma | strigosa | strigosa | grisea | 6 and 7 dark | | b. 2nd spine largely developed, directed backwards, large below valve. No British representative; 17 American. |
| | | Jocheneva | alni | alni | funeralis? | 6 and 7 dark | | Valve obsolete. |
| | | Cuspidia | megacephala | megacephala | (none) | 6 and 7 dark | | 8rd spine large and chin-like. |
| АРАТЕЛА, Hb. | Americana | Tricholonche | persuasa | (none) | afflicta, persuasa | | Viminia | 1 spine centre of valve, directed backwards. |
| | | Lepitoremus | hamamelis | (none) | ovata, hamamelis | | | 1 spine directed upwards and inwards with forward curve. |
| | | Acronycta | leporina | leporina | leporina | 7 dark | | |
| | | Megacronycta | americana | (none) | americana | 3 and 4 dark | | |
| ФРАБЕТТА, Hb. | Auricoma | Apateia | aceris | aceris | rubricoma | | All tubs. one-haired | |
| | | Viminia | menyanthidis | menyanthidis | ? | | | |
| | | Phaetra | auricoma | auricoma | auricoma | | | |
| | | Bulonche | oblinita | (none) | oblinita | | | |
| АРСИЛОНЧЕ, Led. | Arsilonche | Philorgyia | luteicoma | (none) | luteicoma | 6 and 7 pale | Ant. trap. multiple-haired | |
| | | Arctomyscis | euphorbiae | euphorbiae (myricae), rumicis | noctivaga | | | |
| | | Arsilonche | albovenosa | albovenosa | albovenosa | | | |
| | | | | | | | | 1 spine directed upwards and inwards with backward curve. |

described as American, the eggs of only six species are known, and of newly-hatched larvæ only ten are clearly defined.

The advance in knowledge which we derive from Smith and Dyar's work is the delineation of the clasps and harpes of nearly all the species; this is most valuable, and it is specially satisfactory that these structures entirely confirm the work previously done in the genus by Dr. Dyar, Professor Grote, and myself. The further sub-divisions of the genus they suggest can hardly be said to affect our British species.

There is a further genus *Merlonche* given, which seems to be a division of *Viminia*. As the early stages are unknown it is difficult to say whether the separate genus is necessary.

There is one statement of Professor Dyar that seems to me quite erroneous. He implies that all the forms of larvæ have many haired warts in the first stage, and says: "In the single-haired forms degeneration has occurred, as may be seen by the presence of true warts in the earlier stages." Yet he describes *tobelliae* (first stage) as having single-haired tubercles, as well as *jurciferæ*, *fragilis*, and *lithospila*, precisely as is the case in the European *Hyboma* (Grote). *J. alni* has single-haired tubercles throughout. The only first stage described in his groups III and IV (*persuasa* and *hamamelis*) is that of *hamamelis*, and nothing is said about the number of hairs to a tubercle. Yet in the general description (p. 8) they are said to have warts in the early stages. There are no British species in these groups, but if it is possible to judge (or perhaps I ought to say, guess) from the other characters of the species, they seem to belong to *Hyboma*, and will prove to have only one-haired tubercles in the first stage, the multiple-haired tubercles belonging to the second stage. Still, Dr. Dyar is no doubt right so far as this, that the normal arrangement is to have multiple-haired tubercles in the second stage and onwards, that this has passed back into stage i, partially in *Apatela*, completely in *Viminia*, and there can be little doubt that single-haired tubercles in the second stage and onwards are not primary possessions, but the result of further evolution or, as Dr. Dyar calls it, degeneration.

I have not referred to the genera *Singra* and *Ulidia*, as they are not American. They are of course Acronyctids, derivatives of *Viminia*. I propose to enter on some further discussion, however, as regards the true position of *Arsilonche* and *Singra*.

Critical Note on the Synonymy of *Fumea sepium*.

By J. W. TUTT, F.E.S.

In working out the Psychid synonymy for my projected account of this group, I was at first somewhat astonished to find that the *Fumea tabulella*, Bruand, which was added to the British list by Barrett (*Ent. Mo. Mag.*, xxxi., pp. 268-269) was none other than the well-known continental species *F. sepium*. I then suspected that Mr. Barrett must have found some reason for separating the British insect from *F. sepium*, and hence it became necessary for me to inspect the specimen of the Worcester Psychid in Stainton's collection, which Barrett had referred to *F. tabulella*, Bruand. With the determination of this specimen as *F. tabulella*, Bruand, we quite agree, but there cannot be the slightest doubt that *F. tabulella*, Bruand = *F. sepium*, Speyer, a name several years anterior to Bruand's. Barrett compares (*loc. cit.*) the British

example with *F. betulina*, but strangely enough makes no reference to *F. sepium*, with which it is co-specific, and of which there is a series in the same drawer as the series of *F. betulina*, in the general collection of the British Museum. Later, in his *British Lepidoptera*, ii., p. 365, Barrett maintains the name as *tabulella*, Bruand, giving *sepium*, Speyer, as a synonym, whilst on p. 368, he writes:—" *F. sepium*, Speyer, which Standinger holds to be the same species, is found, besides France, in central and southern Germany, Belgium, and eastern Russia." Reference to the original description of Speyer shows that all this doubt is absolutely unwarranted, and that the German lepidopterists were quite clear about the matter when they made *tabulella*, Bruand, a synonym of *sepium*, Speyer. Reference to Bruand (*Mon. des Psychides*, p. 102) shows that this author knew in 1853 that his species was *sepium*, Speyer.

The synonymy, so far as it goes, is correctly given in Standinger and Wocke's *Catalog*, p. 65. But it is quite evident on reference to the literature bearing on these names that, whatever species *tabulella*, Bruand, may be, it is also *tabulella*, Gn., *Ann. Soc. Ent. France*, 1846, p. 15, for Guénée described his *tabulella*, from the same insect that Bruand had named and figured as *clathrella*, in the *Ann. Ent. Soc. France*, 1844, p. 15, pl. vi., i. E. Guénée notes (*loc. cit.*, 1846, p. 11):—" Lastly, there is the Tineid described by M. Bruand, which he has obligingly sent to me, and which differs from all the others, on account of its deep colour, and by its apparent resemblance to the Psychids of the *nitidella* group. I name it *tabulella*." There is no need to quote the diagnosis to be found on p. 15. In his *Mon. des Psychides*, p. 102, Bruand accepted Guénée's correction, and called the insect (the same individual serving for the type), "*Psyche tabulella*, Guénée = *clathrella*, Bruand, *Soc. Ent.*, 1844 = *sepium*, Zeller, Speyer in litt." After explaining how, acting on the advice of Duponchel, he came to call the insect *clathrella*, he says that some time after he had named his species *clathrella*, he received the true *Solenobia clathrella* from Austria, and saw that the species were distinct. He then gave, in his collection, the name of *claustrilla* to his insect, but that, in the meantime, M. Guénée, who had noticed the error, had named the insect *tabulella*, and he adds that he accepted the name on the ground of priority. Bruand, however, still made an error in writing, "*sepium*, Zeller, Speyer in litt.," for the name was Speyer's, and his life-history (*Isis*, 1846, p. 31) is still the best one extant. The synonymy, therefore, works out as follows:—

Sepium, Speyer, "*Isis*," Jan. 1846, p. 31; "*Geog. Verb. Schmett.*," i., p. 460 (1858); H.-Sch., "*Sys. Bearb.*," v., p. 62 (1855); "*Neu. Schm. Säckel*," fig. 10 (1855); Breyer, "*Ann. Soc. Ent. Belge*," 1861, p. 6, pl. iii.; Staud., "*Cat.*," p. 65 (1871). *Clathrella*, Brd., "*Ann. Soc. Ent. France*," 1844, p. 195, pl. vi., i. E. *Tabulella*, Gn., "*Ann. Soc. Ent. France*," 1846 (*post. March*), p. 15; Zell., "*Linn. Ent.*," vii., p. 358 (1853); Bruand, "*Mon. des Psych.*," p. 102 (1853), Wocke (with doubt), "*Cat.*," p. 266 (1871); Barr., "*E.M.M.*," xxx., p. 268 (1894); "*Brit. Lep.*," ii., p. 365 (1895).

Why, out of this wealth of synonymy, Barrett selected *tabulella*, Bruand, to stand for the species, is beyond my comprehension! One would have not been surprised had he been fogged between *sepium*, Speyer, and *tabulella*, Guénée, the former with only a few months' priority. One can only surmise that he possibly took the first name that offered. We have not referred here to the great probability that *nana*, Borkhausen, is this species.

Contribution to the life-history of *Psyche zermattensis*.

By A. BACOT.

The CASES which were obtained by Dr. Chapman at Locarno were very remarkable, owing to the large quantity of mica particles used in coating them. They are about half-an-inch long, cylindrical, tapering slightly from the anterior (head) end, and covered with small fragments of sand, quartz, and thin flakes of mica, the latter making it appear as so much tinsel, at least in all the cases I have. The interior of the cases is composed of fine white silk.

The LARVÆ are short and stout for the size of the case, about 7mm. in length. The head and thoracic segments black; the abdomen bright orange to the end of the 7th abdominal, the 8th, 9th, and 10th abdominals dark brown and chitinous. The head and thorax are large, making up rather less than one-third and rather more than one-fourth of the total length. The larva lies quiet under examination, with the body somewhat curved, the anal segments being bent somewhat beneath the body. *Head*: large, black, glassy, with rather short, but stout, scattered hairs. *Thorax*: The thoracic segments also black and glassy, but with a pale whitish anterior margin, especially noticeable on the meso- and metathorax. The thoracic segments taper gradually, the prothorax about half as long again as the 2nd and 3rd thoracic, the head partly retractile within the prothorax. The true legs large and strong, lower joints black and glassy. [I have noted elsewhere (in other notes on the Psychids) that the legs are short and strong; this is hardly correct so far as comparison with other larvæ is concerned. I think the legs are really quite as long proportionately as in other larvæ, but their great thickness and strength makes them look short.] *Abdomen*: The 1st abdominal segment is somewhat shorter than the last thoracic, and only slightly thicker; the abdominal segments increase in length and thickness gradually to the 6th, which is much the largest (more than twice the length of the 1st) segment. The 7th is much smaller, whilst the 8th and 9th are very small; the larva tapers rapidly from 6th to anus. The *prolegs* are the same as in other Psychids I have examined, i.e., the 1st to the 4th pairs, with pit in centre of foot, and with almost complete circle of hooks, the hooks large and strong. Anal claspers have a less complete oval of hooks. The *skin*, wherever it is horny or chitinous, has a fine cell or irregular reticulation on it. The *plates* at the base of the tubercles on the abdominal segments are large. The *tubercles* are as in other Psychids: i is small, bears weak hair, and is external to ii; ii is larger, and with a stronger hair, is inner to i; iii, supra-spiracular, is a fair distance above spiracle, if anything slightly anterior to it, this tubercle bears the largest hair; iv and v, sub-spiraculars, are small, especially the anterior one of the pair = v. These are rather close together, well below spiracle, and nearly or quite in line with one another longitudinally. The chitinous plates at the base of tubercles i and ii on the 1st abdominal have become enlarged until their edges have coalesced. The lateral ridges are fairly well developed. On the first abdominal there is a weak extra chitinous plate, posterior to the subdorsal position, as in the larger species, but only present on the 1st abdominal in this species, I cannot, however, trace any signs of hair or tubercle on it. The 3rd abdominal segment bears an extra subdorsal tubercle and hair on right-hand side

only. This is in line (horizontally) with iii, but considerably smaller and towards the posterior edge of the segment. The *spiracles* are oval, not very conspicuous, only slightly raised at rim, rather well forward on abdominal segments, that on the 1st thoracic is larger and placed very far back. The *dorsal hairs* on the 2nd and 3rd thoracic segments are placed somewhat as on abdominal segments, but the inner and posterior hair is the smaller. There is a narrow white medio-dorsal line on thoracic segments. I can find no trace of any extra dorsal tubercles corresponding with those noticeable on the larva of *Zenusa pyrina*. [Described April 22nd, 1899.]

The ♂ PUPA agrees closely with a pupa I described last year, but could not name. It is possibly rather more slender, but is, I should say, closely allied. The pair of larger ventral hooks are similar, the short abdomen, and length, as well as the large size of wing-cases all agree. The length is about 6mm., and the pupæ about 2.5mm. in diameter at widest point. It is slightly constricted dorsally at the junction of the abdominal and thoracic segments; a corner and narrow margin of hind-wings are exposed beneath primaries. On the dorsal anterior edge of the abdominal segments 5, 6, 7, 8 are raised areas of roughnesses or short, stout spines; on the 5th these are slight, on the 6th and 7th they are rather prominent, but on the 8th, though the size of the patch is small, it is very prominent and forms a much raised ridge. The spines on all these anterior patches point backwards towards anus. On the posterior edge of the 4th, 5th and 6th abdominal segments is a narrow but rather lengthy row of much finer and slighter spines which point forwards towards head.* The surface of the pupa is somewhat crenulated and roughened, causing a dead surface. Very fine and slight hairs are present (on abdominal segments) in the same position as those on larva. The colour bright pale brown, dark on the dorsum of the abdominal area but pale on the mesothorax. The ventral head-piece, the eye-covers, &c., stand up (rather raised) above rest of surface.

* The posterior spines noticed by Mr. Bacot are very remarkable, they are on that portion of the intersegmental membrane that folds in, a very unusual situation for spines. When the segment is fully stretched they point, as Mr. Bacot notes, forwards rather than backwards. As the segments close and the membrane rolls under, they will point outwards and then backwards as they disappear into the incision. They will act, therefore, not merely as points of purchase against the silken interior of the case, but as levers. They are characteristic of the Marco-Psychid male pupæ.—T.A.C.

Migration and Dispersal of Insects: Odonata.

By J. W. TUTT, F.E.S.

Fowler published (*Ent. Mo. Mag.*, xxiv., pp. 204-205) an interesting summary of extracts relating to the migration of insects, obtained from the reports on the "Migration of Birds," published by the British Association. Among other items of information the Heligoland Report for 1884, notes that on July 3rd "myriads of dragonflies" passed the lighthouse; but, although the extracts give records of several species of Lepidoptera, Hymenoptera, Coleoptera, &c., this is the only reference to the Odonata to be found here. Cordeaux also notes (*Ent.*, xxii., p. 189) a communication from Gütke, asking whether there had been a recent immigration of dragonflies into England, as on May 21st-

22nd, 1889, they swarmed in millions at Heligoland, and continued to do so until the 26th, when the wind became northerly, and next morning not a single one was to be seen. Gätke's own account of these visitations suggest the somewhat regular appearance of these insects on the island. He notes (*Heligoland as an ornithological observatory*, p. 87) that the regular but temporary appearance, in millions, of *Libellula quadrimaculata* always takes place in Heligoland just before a thunderstorm. Countless swarms of these insects, he says, make their appearance all of a sudden during the calm, sultry hours just preceding such a disturbance, but the direction whence the insects proceed cannot be ascertained. They do not arrive in swarms or companies, but solitary individuals or scattered groups congregate on the spot in one vast throng. The assembling individuals or groups must, however, follow each other in very rapid succession, for, in a short time, the face of the cliff, all the buildings, hedges, and dry twigs on the island are covered with them. The insects disappear as suddenly as they appear, so that hardly one of them is discoverable on the following morning. It is not known whether they proceed further west. It is certain, however, that they do not remain here, nor does one find them lying about dead after a thunderstorm.

With regard to the Weimar migration already alluded to, we note that in the *Mag. of Nat. Hist.*, 1839, p. 516, Weissenborn records that on May 30th and 31st, 1839, immense cloud-like swarms of *Platetrion depressum* passed in rapid succession over the town of Weimar and its neighbourhood, the general direction of the swarm being from south by west to north by east. The migration was also observed in all the villages situated a few miles to the east or west. The insects arrived in a vigorous state, some of the flocks flying as high as 150ft. above the level of the Ilm and striking against the windows of a house situated on an eminence, others passing through the streets. The observer attempted to collect details as to the migration, and ascertained that cloud-like swarms were seen at Göttingen, on June 1st; Eisenach, on May 30th-31st, flying from east to west; at Calais, June 14th, flying in the direction of the Netherlands, but the latter were, from the description, possibly another species. Local swarms of dragonflies were also observed in the neighbourhood of Leipzig, Alsleben, Aschersleben, and Halle, the examples captured at the latter place showing that the species was *Libellula quadrimaculata*, the swarms arriving on the afternoon of May 30th, a short time before a thunderstorm, and flying very rapidly from north to south. On May 31st similar flocks followed in the same direction, most of them passed at a height of 7ft. to 8ft., catching insects as they flew on. The swarms were everywhere observed within a league of Halle in almost every direction, while the whole valley was inundated by the river Saale. *L. quadrimaculata* is noticed as being usually scarce at Halle, and *P. depressum* also scarce about Weimar. The migrations appear to have extended from 51° to 52° N. lat., and within 27° 40' to 30° E. long. of Ferro, but the migration observed at Calais suggests that they were possibly spread over a great part of Europe, wherever suitable meteorological conditions prevailed. The last migration of Odonata preceding this, observed at Weimar, had taken place June 28th, 1816, the species then also being *P. depressum*. The year 1816 was extremely wet, and 1817 equally so, yet no migrations were observed in the latter year. The

difference between the dates May 30th-31st, 1839, and June 28th, 1816, is also noticed. The suggestion is made that the great multiplication of the insects in 1839, was due to the excessively rainy weather from May 1st to 21st. Much of the lower ground near the river was inundated. Hence myriads of pupæ which would have remained in deep water under ordinary circumstances, were brought into shallow water, and the hot weather from May 21st to May 29th converted these shallow pools into true hot-beds. It is further suggested that the numerous thunderstorms about that time at Weimar greatly encouraged the rapid development of the imagines, and so the insects rose almost at once from the temporary swamps, and were obliged to migrate to satisfy their voracious appetites. Weissenborn further notes that on their migrations the dragonflies followed the direction of the river, appearing always to fly with the current, spreading over wide districts on either side of the river in order to subsist. Hope, at the meeting of the Ent. Soc. of Lond., October 7th, 1839, stated that he witnessed a nearly similar migration of the same insects some years previously at Netley, which he attributed to the drying up of some large reservoirs of water. In this instance several distinct species were observed.

Ghiliani records that, in 1867, there was a most unusual appearance of swarms of *Anax mediterraneus* in Italy. Previous to this the species had actually been erased from the European list, although the original description was made from a single individual taken in Sardinia.

Campbell notes a migration of *Eschna mirta* that took place on September 23rd, 1884, on the banks of the Gironde, about seven miles from St. Estèphe. The insects were first noticed about 5.0 p.m., and the flight lasted from one and a half to one and three-quarter hours. The dragonflies were from five feet to fifteen feet apart, and were taking a steady up-river course, at a height of from ten to fifteen feet above the ground, whilst the width of the flight was about 150 yards. The observer suspected, from the size of the examples, that there were two species, the larger proving to be *E. mirta*. The weather was fine and warm, but the sky was clouded, and rain had fallen during the day, whilst there was little or no wind. In the *Revue des Odonates*, p. 131, Sélys says that *Eschna grandis* sometimes undertakes considerable migrations. Another observer describes a migration which he witnessed in the Alps, and states that "all the way from Haspenthal to Andermatt the dragonflies were to be seen coming up against the wind, which was blowing from the west. There was no mistake about it; countless numbers were steadily passing up the valley, but whither they were going it was hopeless to ascertain. They did not seem to turn up the St. Gothard road, for I remarked them the whole way up the valley to the foot of the Furka Pass westwards."

Walker, writing from the yacht "Aline," Palermo, April 5th, 1873, records (*Entom.*, vi., p. 457) that from the time the yacht left Tunis, all along the Malta Channel, and on to Italy, the sea was covered with large brown butterflies, moths of all sizes, and dragonflies, evidently just dead, as they had apparently not been long in the water. For four or five days, he adds, the yacht sailed through many miles of water without finding any diminution in their number.

COLEOPTERA.

Notes on the additions to the British List of Coleoptera since Canon Fowler's "Coleoptera of the British Isles."

By HORACE DONISTHORPE, F.Z.S., F.E.S.

(Continued from p. 161.)

Philydrus coarctatus ab. *suturalis*, Sharp.—This addition, in the 1893 Catalogue, is the aberration of *suturalis* (= *coarctatus*, Gredl.), described by Sharp in the *Ent. Mo. Mag.*, vol. ix., p. 152. He described his aberration, to which he did not give a name, thus—"var. palpis maxillaribus articulo secundo (intermediumque quarto medio) leviter infuscato." Kuwert, in the *Bestimmungs Tabellen* treats Sharp's *suturalis* as a synonym of *coarctatus*, Gredl., and his ab. of *suturalis* as ab. *suturalis*, Sharp.

Helophorus obscurus ab. *shetlandicus*, Kuwert.—Kuwert, in *Verhandlung des naturforschenden Vereins in Brünn*, vol. xxviii., p. 227, under *Helophorus obscurus*, writes:—"From the Shetland Isles comes a variety of this insect, with black metallic shining elytra, in form and shape true *obscurus*, Muls., v. *shetlandicus*, Kuw." It seems to me that this aberration, and the next, should be added to the British list, as they are evidently genuine, and, from their descriptions, well-marked forms.

Helophorus griseus ab. *bulbipalpis*, Kuwert.—Kuwert, in the same publication as the above, p. 196, says of *Helophorus griseus*:—"Examples from the Shetlands with so strongly thickened last joints of the palpi that they seem almost deformed = ab. *bulbipalpis*, Kuw."

Octhebius lejoli, Muls.—Bennett (*Ent. Mo. Mag.*, vol. xxxi., p. 181). Taken by Mr. Bennett in numbers in pools of stale salt water, near Ilfracombe.

Aleochara succiola, Thos.—Champion (*Ent. Mo. Mag.*, vol. xxxiii., p. 97). It is mixed with *A. modesta*, Grav., in British collections.

Homalota pruinosa, Kraatz.—Champion (*Ent. Mo. Mag.*, vol. xxxiii., p. 274). Taken by Mr. Elliman on chalky paths and in grassy places at Chesham.

Homalota clarigera, Scriba.—Champion (*Ent. Mo. Mag.*, vol. xxxiv., p. 266). Taken by Mr. Elliman in dead leaves in a ditch at Tring.

Homalota divisa ab. *angulata*, Sh. and Fowl. (nec Blatch).—Mr. Blatch tells me that this is a very marked aberration, he has not yet, however, published the description. He has taken it in dead moles and hedgehogs, near Birmingham. It appeared for the first time in the 1893 Catalogue.

Stichoglossa semirufa, Er.—Champion (*Ent. Mo. Mag.*, vol. xxxv., p. 55). Taken by Mr. Harwood, near Colchester, by beating oaks in May.

Arena octavii, Fauv.—Mr. Blatch mentions in the *Ent. Mo. Mag.*, vol. xxviii., p. 160, that this species had been taken by Mr. Tait, at Ilfracombe, in a dead gull, and by himself under stones in sand, in company with *Phytosus balticus*, on the Chesil beach. It is described by M. Fauvel in the *Annales Ent. Soc. Fran.*, 1862, p. 292, as follows:—"Brunneo-testacea, nitidula, aureo-pubescent, capite brunneo, crebrè subtiliter punctato, abdomine toto nigro, parè subtilissime punctulato, apice rufo-testaceo, thorace quadrato, angulis obtuse rotundatis, disco

linea tenui media impresso, elytris hoc paulo longioribus. L. $1\frac{3}{4}$ mm. Facie quasi *Phytosus balticus* videtur."

Phytosus nigrirentis, Chevr.—This species is omitted in the 1893 Catalogue. Fowler (*Col. Brit. Isles*, vol. ii., p. 170) regards it as a form of *P. balticus*, Kr., and says:—"It seems very probable that the two species are identical." It is a good species and must be reinstated, as pointed out by Mr. Champion in the *Ent. Mo. Mag.*, vol. xxxv., p. 1. The British localities known for it at present are Mablethorpe, Chesil beach, and Flintshire. It will probably turn up in other places.

Quedius nigrocaeruleus, Rey.—In the *Ent. Mo. Mag.*, vol. xxxii., p. 50., one specimen is mentioned as having been taken by Mr. Tuck at Bury St. Edmunds in a nest of *Bombus hortorum*, it was then recorded as a var. of *Q. mesomelinus*, Marsh. Mr. Morley in recording further specimens, points out (*Ent. Mo. Mag.*, vol. xxxiv., p. 267) that it is a good species.

Quedius riparius, Kelln.—Blatch (*Ent. Mo. Mag.*, vol. xxxiii., p. 80). Taken in some numbers by Mr. Blatch, on the margins of swift waters, near Porlock. Also taken by Mr. Chitty in flood refuse from the river Beaulf, Inverness.

Quedius kraatzii, Bris.—Donisthorpe (*Ent. Record*, vol. x., p. 196). The first few specimens were taken by Professor Beare and myself, on the banks of a stream at Chiddingfold. I afterwards took it again in some numbers.

Philonthus unbratilis, Grav.—This species is omitted in the 1893 Catalogue, no doubt by an oversight.

Platystethus alutaceus, Thoms.—Champion (*Ent. Mo. Mag.*, vol. xxxiii., p. 98). Taken by Mr. Keys at Slapton Ley, Devon.

Neuraphes planifrons, Blatch.—Blatch (*Ent. Mo. Mag.*, vol. xxvi., p. 98). Taken by Mr. Blatch under bark of birch stumps, in Sherwood Forest.

Hippodamia variegata ab. *englehardi*, Rye.—Rye (*Ent. Record*, vol. iv., p. 243). Taken by Mr. B. G. Rye, at Swanage, Dorset.

Anatis ocellata ab. *hebrava*, L.—A specimen of this aberration was taken by Mr. B. G. Rye at Oxshott, in 1892, in company with the type, by beating firs. The elytra are brownish-yellow with an irregular black line transverse at base, and continued from the shoulders on the outer margins for about two-thirds of the length of the elytra, and with two longitudinal black lines on the disc of each elytron, the line nearest the suture being slightly the longer.

Micraspis 16-punctata ab. *poweri*, Weise.—This aberration is omitted in the 1893 Catalogue. Fowler (*Col. Brit. Isles*, vol. iii., p. 168) says:—"This variety has the upper surface, or at all events the elytra, unicolorous black; it has been found in Lee pit near London, rarely, by Dr. Power, in whose collection there is also an intermediate variety." Crotch (*Revision of Coccinellidae*, p. 182), under *Micraspis 16-punctata*, writes:—"In an immense series of this insect, taken by Dr. Power in England, are specimens with the spots confluent, and several quite black, this is a variety that has not been recorded before." Weise from this note of Crotch's described this aberration in *Zeitschrift für Entomologie*, Breslau, Siebentes Heft, 1879, p. 127:—"Var. d. Flgd. einfarbig schwarz (Crotch, *Revis.*) v. *poweri*." There are a dozen specimens in the Power collection.

Olibrus affinis, Sturm.—In the 1893 Catalogue this species is treated as a synonym of *particeps*, Muls. It is, however, a good species, as pointed out by Mr. Newbery (*Ent. Record*, vol. xi., p. 137). Mr. Champion has taken it in the New Forest, and Mr. Newbery in the same locality, as well as at Hythe.

(To be concluded.)



ORTHOPTERA.

Parasites of Orthoptera.

By MALCOLM BURR, F.Z.S., F.E.S.

It is well known that Orthoptera are subject to the attacks of parasites of various kinds, chiefly protozoa, parasitic worms and fungi, e.g., *Isaria*, *Entomothora* and other fungi have long been known to cause the death of grasshoppers, and they have been seriously considered as a means for combating locust plagues. A diseased insect crawls up on a stem of grass and there dies. The fungus destroys the internal organs until the insect will crumble at a touch; the spores are then scattered to continue their mission of destruction.

Bütschli notes a *Spirillum* (*Schizomyces*) in the rectum of the cockroach. Filaments of a minute *Alga* also abound in the rectum of the cockroach, which Valentin says is *Hygrocybe intestinalis*, one of the *Cyanophyceae*. The same parasitic *Alga* is said to occur in the crayfish.

Protozoa are common in *Entamoeba blattae*, Bütschli (*Rhizopoda*), in the rectum, whilst *Gregarina blattarum*, Stein., is fairly common in the chylic stomach, gizzard and large intestine. Of the Infusoria, *Nyctotherus oralis*, Leidy, is known to inhabit the intestine of *Blatta gryllotalpa*, and *Plagiotoma* (*Bursaria*) *blattarum*, Stein., the rectum. Clarapède considers these two species to be identical. There are three species of *Lophomonas*, all of which occur in the rectum of *Blattidae*. They are, *L. blattarum*, Stein., and *L. striata*, Bütschli, in *B. orientalis*, and *L. sulcata*, Schust., in *Periplaneta americana*.

Nemathelminth worms are common parasites on Orthoptera. In the Hamburg Museum there are specimens of a *Gordius* taken from the intestines of some cockroaches from Venezuela. A *Gordius*, of dimensions really gigantic, is recorded by Siebold in *Decticus verrucivorus*, L. Several species of *Oxyuris* are known to be taken in *Blatta*. *O. diesingi*, Ham., is frequent in the rectum, *O. blattae-orientalis*, Ham., much rarer. Leidy mentions *O. gracilis* and *O. appendiculata*, and Van Beneden notes *O. macronura*, Radk., in the same situation.

In 1876, Rev. Fitzroy Kelly Lloyd exhibited at the Entomological Society of London a worm two inches long, taken from the abdomen of an earwig. Mr. Pascoe said it was probably a *Filaria*. *Filaria rhytipleurites*, Galeb., is found encysted in the fat body of the cockroach, and in the sexual state in the alimentary canal of the rat.

In Arachnida, an *Acarus*, sp., was found by Cornelius on the sexual organs of the male cockroach, and Dr. Sharp observed *Acari* on the hind legs of *Gryllotalpa*. They were so symmetrically placed that they appeared to be a part of the structure of the limb, which possibly prevented them from being rubbed off when the creature moved. Mr. R. T. Günther has informed me that he noticed the same thing on grasshoppers in northern Persia.

Among insects we find examples of Diptera, Hymenoptera, and

Coleoptera, parasitic on Orthoptera. Mr. Butler found a footless grub, probably the larva of a *Tachina*, in the abdomen of *Forficula auricularia*, L., and Boheman reared *Tachina setipennis* from a pupa taken from the swollen abdomen of the same species. Westwood notes that the common earwig is attacked by an ichneumon, and *Erania appendigaster*, L. (*Ichneumonidae*), is parasitic on *Blatta* and *Periplaneta*. Of Coleoptera, the apterous female of *Symbius blattarum*, Sund., is parasitic on *P. americana*, L., and *P. germanica*, L. Aclogue mentions that *Raphidius pectinicornis*, Thunb., occurs "sur les Blattes" in Germany, the species being *Phyllodromia germanica*, according to Canon Fowler.

Orthoptera, therefore, have many enemies, internal as well as external, against which they are continually struggling, and with a result that, it sometimes seems, still partakes too much of the nature of success.

MYRMECOPHILA ACERVORUM, PANZ., AS A BRITISH SPECIES.—In the *Proceedings of the Entomological Society of London*, 1869, p. 65, Westwood records *Blatta acervorum*, Panz., as having been taken by Mr. Hope in moss in Archdeacon's copse, near Netley, Salop. The correct name of the species should be *Myrmecophila acervorum*, Panz., it being one of the *Gryllodea*, and not a *Blatta*. I have in vain searched for the specimen in the Hope Collection, as this little cricket would be a most interesting addition to our fauna; but it can scarcely be included in the British list until confirmatory evidence is brought forward. It is a very small wingless insect, measuring about 3.5mm. in length, reddish in colour, with very well developed posterior femora. It is found under stones in nests of various species of ants. It has been taken sparingly in widely separate districts in Europe. The following are recorded: Berlin, Thuringen, Halle, Saxony, Bohemia, near Vienna, Orsova, Mehadia, near Paris, Hyères, Valencia, Alicante, Pisa, Krim, Naples, and Aguillas. Brunner writes that it is not known in Switzerland, but I have specimens in my own collection from that country. Seeing that it occurs so far north as Berlin, it is quite possible that it may be a native of Great Britain, and collectors should specially look out for it: its small size, and, I should guess from the development of its hind femora, great activity, probably makes it difficult to capture.—MALCOLM BURR, F.Z.S., F.E.S., Bellagio, East Grinstead.

PRACTICAL HINTS.

Field Work for July.

By J. W. TUTT, F.E.S.

1.—The imagines of *Agrophila trabealis* (*sulphuralis*) occur in June and July, taking short swift flights from one place to another when disturbed. The species is somewhat difficult to discover when at rest, and is not unlike a *Coccinella* in some positions. About five p.m. is the most natural time of flight.

2.—The males of *Cuchlidon arellana* (*linacodes*) fly high up over the oaks at midday, in the hottest sun, in July, and require a long-handled net for their capture. The females (and males in dull weather) are best obtained by jarring the small oak trees growing in wood clearings.

3.—During July the imagines of *Nudaria senex* fly most abundantly at dusk, gently hovering over reeds, rushes, &c., in marshes and fens, afterwards resting on the herbage, where they may be found by searching with a lantern. They also come freely to light.

4.—*Lithosia lutarella* var. *pygmaeola* is best obtained when sitting at rest on the marram grass after dark. On some evenings it comes quite freely to light. Can also be found in very early morning resting on grass or gently flying, sometimes "assembling" to a newly-emerged female.

5.—In July and August the imagines of *Emerobia ochroleuca* are to be obtained sitting in the centre of the flowers of *Centaurea scabiosa*, in the afternoon.

6.—The yellow central leaf of *Phragmites arundo*, in late July, denotes the presence of the larva (or pupa) of *Nonagria geminipuncta*. Cut low down, and keep in water, or empty the pupæ out upon damp flannel.

7.—The larva of *Nonagria sparganii*, which feeds very similarly to that of *N. arundinis* (*typhæ*), should be sought in the marshes around Hythe, Deal, &c., in July and August.

8.—The imago of *Dyschorista fissipuncta* sometimes flies in swarms about the higher branches of willows at dusk in July (also comes to sugar).

9.—The larva of *Notodonta ziczac* may be beaten from sallow, aspen, and poplar, from July to October.

10.—The imagines of *Lobophora sexalata* fly swiftly over the tops of sallow bushes at dusk in July. Sometimes very common at Wicken, Ranworth, Horning, New Forest; it appears also to be very generally distributed in Kent.

11.—The imagines of *Anticlea cucullata* (*sinuata*) are to be disturbed from among *Galium* (at Tuddenham and elsewhere) during the daytime in early July; the species is better obtained by searching for larvæ in August and September.

12.—After dusk in July the males of *Geometra vernaria* "assemble" freely to the females that are hidden in the *Clematis* bushes. They may often be disturbed during the day when working for *Phibalapteryx tersata*.

13.—To obtain *Phibalapteryx tersata* by day thrust a stick into the *Clematis* bushes, and churn them gently so that every part of the leafage is disturbed. It is most abundant during the first week in July.

14.—The imagines of *Acidalia rusticata* are sometimes to be taken in abundance in early July, sitting on leaves of ivy, pellitory, &c., growing at the foot of the rocks near the seashore, or at the foot of old hedges.

15.—Imagines of the beautiful *Chrosis rutilana* used to be taken freely, flying by day in July and August, among juniper on the Surrey downs.

16.—The imagines of *Dicrorhampha simpliciana* fly by day in July and August, among mugwort (*Artemisia*). The larvæ feed in the roots during the autumn and winter months.

17.—The chance capture of a specimen of *Homocosoma sinuella*, in early July would always result in the capture of many, if properly worked for; the species is most easily disturbed in the late afternoon, when it often flies freely, and continues to do so until dusk.

18.—The imagines of *Tortrix transitana* (*diversana*) fly at dusk in

July, over the tops of birch and elm trees, on which the larvæ feed in spring.

19.—The seeds of cowslip should be gathered in July for larvæ of *Eupoecilia rufigiliana*.

20.—The imago of *Ditula semifasciana* flies at dusk in July and August, over the tops of salallows growing in damp and marshy places; it will also come to sugar. The larva feeds in the shoots (and catkins) of sallow in April and May.

21.—Sweep the flowering heads of *Daucus carota* in July, for the imagines of *Semasia rupillana*.

22.—In July the imagines of *Fidonia brunneata* (*pinetaria*) are easily disturbed during the day, and fly sometimes quite freely in the afternoon sun.

23.—Dusking along the reed beds in marshes is always very productive during July, *Chilo phragmitellus*, *Calamia phragmitidis*, *Leucania straminea*, &c., are thus to be captured.

24.—*Scotusia rhannata* and *S. retulata* fly freely at dusk round clumps of buckthorn in woods, hedgerows, fens, &c., during July.

25.—*Cidaria picata* is to be obtained in July by searching the tree-trunks in our southern woods, preferably fairly early in the morning.

N.B.—For series of similar hints for July read vol. x., pp. 179-180; vol. ix., pp. 180-181; vol. viii., pp. 116-118, &c.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

EGGS OF LEPIDOPTERA.—*Phytozeta viridaria*.—After his description of the very remarkable egg of this species (*Ent. Record*, vol. ix., p. 291), Mr. Tutt queries as to whether he or Mr. Hellins may have made some mistake as to the identity of the egg. Mr. Tutt is certainly correct. Mr. Hellins probably also, in so far that no very detailed account of eggs was considered necessary at the time he wrote. The covering of upright spines is very curious. Viewed from above (newly laid) the egg is white, overlaid by a very delicate brown network, so pale as hardly to be visible at the micropyle, where its cells are very small. Round this are six or seven cells a little larger, then seven or eight rather larger, and again about ten larger still, *viz.*, about the size of those on the rest of the egg. These circum-micropylar cells are mostly pentagonal, and have no spines. Beyond this the cells are triangular, and have a spine at each intersection of the network. The brown lines of this network hang in curves from spine to spine, as though they would fall to the centre of the egg if not upheld by the spine, producing a very beautiful effect. The spines round the micropylar area form a circle of about ten or twelve in number, and the numbers increase rapidly in the succeeding circles, till at the equator of the egg there are about 38-42 in the complete circle. In the area of increase the triangles are packed together, five, six, and eight to a spine; round the equator they are arranged very regularly, in a hexagonal pattern, so that, looked at from above, the spines are vertically above one another, not altogether foreign to the Noctuid pattern of a vertical ribbing, whilst the cross lines of the network form a Jacob's ladder between the rows. The number of spines from above downwards to form a row seems very great, but when actually counted from the micropyle, to where they cease towards the base (which is smooth), they are really eight to ten in number. As viewed from

above the vertical rows increase in number by division and intercalation, just as the ribs do in many Noctuid eggs.—T. A. CHAPMAN, M.D., F.Z.S. [We observe since the above was in type that Hellins noticed the inadequacy of his first description of the egg of this species, and followed it up by a more complete one, *E.M.M.*, vol. x., p. 139.]

The following eggs were all described when holiday keeping, using a two-thirds, as a hand, lens, and must be taken for what they are worth:—

Anthrocera pucedani.—Of a pale straw-colour when freshly laid; oval in outline; depressed over almost the whole of the upper surface; the surface wrinkled longitudinally, only slightly shiny, and apparently finely pitted; uniform in colour (not with one pole transparent, so far as could be observed). Length: breadth: height, about as 4: 3: 2. One female laid about 154 eggs, with many loose scales scattered over the egg-masses, which are deposited in the most regular manner in rows, with the long sides touching each other, and without any visible space between the successive rows. [Described from eggs laid by a red-belted, six-spotted female, captured at Aix-les-Bains, July 27th, 1898.]

Acidalia rufata.—Pearly-white in colour, with a very faint pinkish tinge when first laid (July 27th); a moderately long oval in outline, with six distinct longitudinal ribs on upper surface; somewhat flattened but no distinct depression on upper surface. By August 3rd they were of a delicate salmon colour, uniformly tinted throughout, with the four longitudinal ribs on upper surface and the two on the edges very conspicuous; there is distinctly no depression, nor is the colour disposed in spots. No trace of embryo is discernible. [Described from eggs laid by a female captured at Aix-les-Bains, July 27th, 1898.]

Syntomis phegea.—A batch of from 50 to 60 eggs were laid in a box in which the ♀ was confined. They are of typical Arctiid shape, about three-quarters or more of a sphere, the apex almost smooth; the remainder of the surface very finely pitted. The surface reminds one of the texture of fine silk. The newly laid egg is of a very pale buff colour. No trace of micropyle discernible with the power at disposal. [Described under a two-thirds, used as a hand, lens, August 14th, 1898, from eggs laid by a ♀ captured the same day at Pré St. Didier.]—J. W. TUTT.

EGG-LAYING OF DRYMONIA CHAONIA.—A male and female *Drymonia chaonia* emerged together on April 17th (the ♀ parent having been taken in trap May 14th, 1898) in the afternoon between 2 and 6 p.m. They were placed together in breeding cage and began to get restless and fly about cage, and about 7.30 p.m. I covered the cage to keep out the light. They were found *in cop.* at 9.30 p.m., and by the 18th at 9.0 a.m. they had separated and the female had deposited 25 ova scattered about the cage. I then killed the ♂ and placed the ♀ in a chip box. No more ova had been deposited by 1 p.m., but by 5 p.m. many had been laid, and by the morning of the 19th, 114. The female was then removed to another chip box, but by 5 p.m. she had laid no more. Shortly afterwards she did, and by the morning of the 20th had laid 41 more, making a total of 170. They hatched on April 28th-29th, in a room without a fire.—E. F. C. STUDD, M.A., Oxtou, Exeter. May 4th, 1899.

VARIATION.

ABERDEENSHIRE FORM OF *TRICHIURA CRATAEGI*.—Our northern form of this insect, although it has not a varietal name known to me, is perfectly distinct in colour from the southern type. Aberdeenshire specimens vary little among themselves, but all are much darker, with little or no trace of the whitish ground colour visible. In all the southern examples that have come my way, the difference between the two forms is quite striking when a series of each is compared.—ARTHUR HORNE, F.E.S., Aberdeen. April 24th, 1899.—[Is not this the var. *ariae*, Hb. ?—Ed.]

VARIATION OF *DIURNEA FAGELLA*.—In this neighbourhood *Diurnea fagella* has been very abundant on tree-trunks, the colour varying from pale-grey or whitish to brownish-black.—T. MADDISON, F.E.S., South Bailey, Durham. May 12th, 1899.

ABERRATION OF *EUCHLOË CARDAMINES*.—I bred a fine lemon-tipped aberration of *Euchloë cardamines* to-day.—W. H. HARWOOD, Station Road, Colchester. May 17th, 1899.

SCIENTIFIC NOTES.

NEW GENERA IN THE MICRO-PSYCHIDS.—In working out the Micro-Psychids, I find that the so-called *Solenobia conspurcatella* and *Taleporia lapidella*, belong to quite distinct genera from those in which they are generally placed. As we are indebted to Mr. Banks for our knowledge of the life-history of the former I propose to describe a new genus *Banksia*, with *conspurcatella* as the type; and as Mr. Luff has given me the material that has enabled me to work out the latter, I propose to describe a new genus *Luffia*, with *lapidella* as the type. The exigencies of priority necessitate this announcement, as I am not desirous of finding, when my next volume is published, that I have been forestalled, and that, the printing being done, it is too late to alter the names adopted.—J. W. TUTT.

NOTES ON COLLECTING, Etc.

LEPIDOPTERA AT BURNLEY.—The weather has been so wretched that I have scarcely done any collecting this spring. I send, however, a list of the best things appearing in my breeding-cage, which might be useful. The pupæ have been kept indoors all the winter, which accounts for the early dates of emergence. SPRING EMERGENCES.—April 3rd-22nd, several *Taenioecampa gothica* from pupæ found at roots of willow, Bungay, Suffolk, mostly of a bright type, with one or two having a decided blue tint; also two from larvæ found feeding on bilberry at Burnley, these were much darker, and had a brownish tinge; also one *T. rubricosa* on the 3rd, larva taken at the same time and place as the *T. gothica*, and also on bilberry. April 3rd-14th, seven *T. populeti* bred from larvæ taken at Doncaster on poplar. April 5th, one *Ctenillia verbasci* bred, larvæ taken at Beverley in 1897. April 24th and May 2nd, two *Cuspidia megacephala*, from Manchester, which had also been two years in the pupal stage. April 28th, two *Ypsipetes impluriata* larvæ, taken on alder at Burnley. May 1st-11th, 12 *Dianthoecia capsivola* from Scarborough and Southport. May 2nd, *Notodonta dromedarius* (ab. *perfusa*), the pupa taken at roots of alder at

Burnley, also a typical specimen (a reddish form) on the 9th, the pupa taken in the same way at Bungay. May 3rd-13th, several *Hadena pisi* from near Wimbledon. May 13th-15th, *Crocallis bidentata* from Manchester district. May 11th, *Eupithecia venosata*, the larva was found on *Silene* at Malton, Yorks. May 13th, *Saturnia pavonia*, from the moors, Burnley; also *Euchelia jacobaeae* from Southport. These have a tendency to form twin spots instead of one large spot on the upper wing, and I have two specimens in which they are quite distinct.—W. G. CLUTTEN, 10, Halliwell Street, Burnley. May 17th, 1899.

COLLECTING IN THE CHILTERN.—I have been favoured with several interesting letters from readers of the *Record*, who have explored the Chiltern Hills at, or in the neighbourhood of, the locality described in my paper (p. 98). With regard to the insects enumerated, Mr. N. C. Rothschild informs me that, as I suspected, *Pamphila comma* and *Argynnis adippe* are common enough at several places in the district, but that *Meänargia galathea* appears to have died out since 1895, together with *Polyommatus bellargus*, and *Melitaea aurinia*. I can only hope that any collectors who may follow in my footsteps will be able to give a better account of the last two species. As far as *M. galathea* is concerned, I should say that it is the one butterfly in the list not taken or observed by me personally, but the record was made, I fancy by Mr. Spiller, who resided at Chinnor, not many miles away, and was published elsewhere. I further stated that the comfortable inn I found was at Little Kimble. This was a slip of the pen, as the hostelry in question is situated at Great Kimble, rather nearer to the best collecting ground.—H. ROWLAND BROWN, M.A., F.E.S., Oxhey Grove, Harrow Weald. May 2nd, 1899.

THE LATE SEASON.—The promise of an early spring has by no means been fulfilled in the localities I have visited since April began. At Easter time I was several days in the New Forest, but the only butterflies I came across were *Eugonia polychloros*, in some numbers near Lyndhurst, and on the road from Christchurch to Leamington; *Aglais urticae* and *Gonepteryx rhamni*, very common everywhere, both within and without the forest proper. *Pieris rapae* was just emerging on April 5th, but though I searched the tree trunks with some care I came across nothing except an odd specimen or two of *Xylocampa areola*. Week-end visits to Stratford-on-Avon and the Chesham districts added nothing further to my April observations.—*IBID.* May 2nd, 1899.

SPRING LEPIDOPTERA.—DEVON.—I have so far noticed the following first appearances out of doors, viz., February 11th, *Phigalia pedaria*, *Amphidasystrata*, *Tortricodes hyemana*. March 9th, *Asphalia flavicornis*, *Antiopteryx aescularia*, *Larentia multistrigaria*. March 12th, *Eupithecia abbreviata*, *Taeniacampa pulverulenta*, *Diurnea fayella*. March 13th, *Selma bilumaria*, *Tephrosia bistortata*. March 14th, *Xylocampa areola*. On March 12th, I bred (kept in a warm room all winter) *Notodonta dromedarius*, ♂, from a larva found at Selby, Yorks, August 7th, 1897, with others. All but this one emerged in May, 1898, but this went over the second winter in pupa. There is nothing to distinguish the moth from the others. To-day (March 20th) there is a heavy snowstorm, and sallowing seems almost out of the question. This morning I brought in the *Lithocolletid* mines that have been out of doors in bags all winter. I found that a few *Lithocolletis riminella*

had emerged, two of which were *in copula*.—E. F. C. STUDD, M.A., Oxtou, Exeter. *March 20th, 1899.*

BOURNEMOUTH AND BROCKENHURST.—I went to Brockenhurst yesterday (April 3rd), and observed several *Drephos parthenias*, all flying actively, and was able to beat a few larvæ of *Cleora lichenaria*, *Metrocampa margaritaria* and *Thera variata*. I have bred *Tæniocampa stabilis*, *T. instabilis*, *T. gothica*, *Pterostoma palpina*, *Amphidays strataria* from dug pupæ, and one example of *Eupithecia coronata*, from larvæ collected from *Clematis vitalba*. Here I found *Xylocampa areola* (*lithoriza*) at rest.—(Major) R. B. ROBERTSON, Forest View, Southborne Road, Boscombe, Hants. *April 4th, 1899.*

CARLISLE.—The most striking meteorological feature of this spring has been the persistency with which the wind has blown from points varying between north and east. Spring lepidoptera have, consequently, been but little in evidence; while those species which have been observed, have been from two to three weeks behind their normal time of appearance. February was nearly over before *Hybernia ripicaparia* put in an appearance on the whitethorn hedges. Several expeditions in search of the ab. *fusata* of *H. margaritaria*, in early March, did not meet with any success; though ordinary forms were tolerably common. On the 13th, a few nice *Larentia multistrigaria* were obtained, and on the same occasion, hibernated *Depressaria applanata* and *D. ocellana* were abroad. About the middle of the month *Diurnea fagella* made its debut, but the smoky form was hardly noticed, though usually it occurs in some numbers. The sawflies were a miserable failure. *Tæniocampids* were singularly rare. No *Tæniocampa gothica*, no *T. papuleti*, no *T. incerta*, no *Pachnobia rubricana*, &c. The only species which turned up were *T. pulverulenta* and *T. stabilis*, about half a dozen of the first and a dozen of the second. The presence of two or three *Orrhothia raccinii*, and a solitary *Scopelosoma satellitia* did little to improve matters. An outing with the treacle-pot was productive of a single *T. pulverulenta*. Two Geometrids usually common in our lanes in April are *Anticarsia baliata* and *Cidaria suffumata*, but the number of specimens taken this spring, by the half-dozen lepidopterists who work this district, is less than one a man! *Tephrosia crepuscularia* (*biundulata*) made its appearance on April 16th, and specimens are still about. At rest on fir trunks, *Xylocampa areola* and *Lobophora carpinata* were sparingly met with. Birch bushes were systematically worked throughout April for the genus *Eriocrania*, with the result that *E. purpurella*, *semipurpurella*, *unimaculata* and *angifella* were boxed. *E. unimaculata* was much the commonest species. At the time of writing *E. subpurpurella* is to be beaten from oak. A few *Amphisa prodromana* were netted as they flew in the sunshine on heathy ground, and a single hibernated *Leptogramma literana* was picked up. Butterflies began to appear at the end of the month—the usual common species. The first days of May saw *Saturnia paronia* on the move among heath, along with the ubiquitous *Ematurga atomaria*. *Incurvaria muscicella* was rather common along hedge banks in lanes. A solitary *Sarrothripa undulans* (hibernated) was taken in a larch wood on the 7th, also two or three *Peritia obscurepunctella*. About the same date *Elachista rufocincta* was first noticed. *Eupithecia abbreviata* turned up among oak on the 14th, on which date *Thera variata* was taken on fir trunks. *Hypsipetes rubrata* was found half drowned in a

pool on the same occasion. Larvæ also have been very scarce. Night-work was productive of nothing worth recording. The cutting down of a number of sallow bushes in a lane, exposed numerous burrows of *Trochilium crabroniforme*, from which full-fed larvæ were extracted. *Depressaria assimilella* abounded between spun broom twigs, and *Cemiotoma spartifoliella* burrowed below the bark. Odd larvæ of *Euthemonia russula* and *Geometra papilionaria* have been taken. The latter is still in the brown skin. At the present time, larvæ of *Butalis grandipennis* are common on furze, feeding gregariously in webs. I saw larvæ of *Melitara aurinia* eating plantain the other day; this may have been on account of the scarcity of devil's bit scabious on the ground. In confinement I can never get them to touch plantain.—F. H. DAY, 6, Currock Terrace, Carlisle. May 20th, 1899.

SPRING LEPIDOPTERA IN NORTH-WEST FRANCE.—For three days the weather has been delightfully warm. *Anthrocera palustris* has already appeared in the avenue of La Hublée—I send you a living example. Yesterday *Melitica parthenis* was common, *M. didyma* just commencing to appear (five males were captured), *Polyommatus hylas* was still fresh, but *M. phoebe* has not yet appeared. To-day *M. athalia* was in very fine condition, *M. aurinia*, however, *passé*; *Carterocephalus paniscus*, males, were also going over, but the females were still fine. *Melanippe hastata* also was in fine condition. On May 29th, in the Forest of Ozoir-la-Ferrière, near Paris, *Coenonympha hero* was in fine condition—I captured examples of both sexes. I have not seen *Nomiades cyllarus* this year, although usually it appears in May. *Limenitis camilla*, *Plebeius argus*, and *Emydia grammica* should soon appear.—C. OBERTHÜR, F.E.S., Rennes, France. June 2nd, 1899.

STELIS OCTOMACULATA AT WROTHAM.—On June 4th I captured the rare inquiline bee, *S. octomaculata*, on the hills above Wrotham. Mr. Saunders says that he does not recollect its capture to have been recorded during the last 20 years.—HUBERT ELGAR, 3, St. Michael's Terrace, Fant Road, Maidstone. June 4th, 1899.

CUCULLIA LYCHNITIS AT BOURNEMOUTH.—On June 1st two imagines of *Cucullia lychnitis* emerged from pupæ which had been subjected to a great deal of wet. *Saturnia paronia*, too, are now coming out—we have bred several females.—(Mrs.) M. E. COWL, Epworth, Marlborough Road, Bournemouth, W. June 1st, 1899.

ABUNDANCE OF PORTHESIA CHRYSORRHOEA IN NAMUR.—I often notice, in your magazine, reports of the comparative rarity in recent years of *Porthesia chrysorrhoea* in England. It is not so here. Yesterday I counted 50 nests of this species in a hedge about 300 mètres in length.—L. J. LAMBILLION, 25, Rue Pepin, Namur. May 4th, 1899.

LEPIDOPTERA AT HAZELEIGH.—The last few weeks have been exceptionally good in some ways. I have taken 44 *Lithosia sorocula* in two afternoons' work. *Hadena genistæ* has been commoner than usual in my garden, where I have also taken two very fine specimens of *Cynatophora octogesima*, an insect quite new to this neighbourhood, as is also *Acontia luctuosa*, of which I took a single specimen a week ago. I am just now breeding a magnificent lot of aberrations of *Spilosoma lubricipeda*.—(REV.) G. H. RAYNOR, M.A., Hazeleigh Rectory, Maldon, Essex. June 12th, 1899.

ABUNDANCE OF MACROGLOSSA STELLATARUM IN THE ISLE OF MAN.—The present month is a record one so far as this species is concerned.

The specimens are to be taken in great numbers just now, hovering over rhododendrons, pinks and other flowers. I have received numerous notes from various persons residing in different parts of this island, commenting on the numerous specimens observed by them. Personally I never remember a season when the species was so plentiful. Last Sunday, about four p.m., I saw a lot hovering over the flowers of a large holly tree in this garden, which is in full bloom, and the scent from which is very strong. The flowers appear to be also very attractive to wasps, bees, and flies.—H. SHORTRIDGE CLARKE, F.E.S., Sulby Parsonage, Isle of Man. *June 10th, 1899.*

DEILEPHILA LIVORNICA IN THE ISLE OF MAN.—Since my note on the recent occurrence of *Deilephila livornica* in the Isle of Man appeared in the *Entom. Record* (*ante*, p. 166), I have been informed that Mr. Garnett has seen several more specimens of this rare insect on the coast, and that Mr. T. Crennell, of Douglas, captured a fine one on the evening of May 28rd; whilst Mr. Murray, of Carnforth, who has recently been visiting the island, saw one on May 26th in the same locality where Mr. Garnett took his on the 12th, but failed to capture it.—*IBID.*

CURRENT NOTES.

The celebrated Dartford Heath fence has been pulled down, and the wood and rough ground inside cleared. This will be a dire calamity for London micro-lepidopterists, as often, during strong westerly winds, the old fence yielded rich harvests of *Tineina*, when collecting these small fry by other means was well-nigh impracticable.

At the annual conversazione of the Royal Society, held at Burlington House on May 3rd, 1899, many of our leading entomologists were present, among whom we noticed Professors Meldola and Poulton, the Hon. W. Rothschild, Drs. Chapman and Dixey, Messrs. Elwes, A. H. Jones, Lloyd, Merrifield, Thornthwaite, and Tutt. The entomological material on exhibition was neither very extensive nor of first-class importance. The Tsetse Fly Committee of the Royal Society exhibited enlarged photographs, taken by Surgeon-Major Ross, illustrating districts in South Africa affected by the Tsetse-fly disease. Dr. Patrick Manson and Surgeon-Major Ross exhibited microscopic preparations of mosquitoes showing the development of the parasites *Philaria nocturna*, Manson and *Proteosoma grassii*, Labbé, in the tissues. The latter is one of the parasites of malaria in birds. Dr. Woodward exhibited zoological specimens from Christmas Island (Indian Ocean). The insects were an interesting lot, but the Lepidoptera were in especially poor condition, nor were the series of sufficient extent to give one much idea as to the extent of isolation. A specimen of *Hypolimnas misippus* captured in the Island is supposed to have immigrated from Java. On the other hand, Professor Poulton's collection of insects from Socotra were in the very best possible condition and well mounted.

We are pleased to note that Mr. G. T. Porritt, one of the oldest members of the Yorkshire Naturalists' Union, is to be the next President of this important and virile combination of natural history Societies. The recent Whitsuntide outing to Dentdale was more or less a failure owing to the unsatisfactory state of the weather, snow lying more or less deep on all the higher summits of the mountains,

The only entomological record of importance was the capture of *Bayrrhus fuscatus* on the Gragreth summit.

We have just received *The Coleoptera of Suffolk*, by Claude Morley, F.E.S. (printed by J. H. Keys, Whimble Street, Plymouth, 1899). It consists of a complete list of all the Coleoptera recorded from Suffolk up to date, a map of Suffolk showing the different districts, a preface embracing a list of the literature relating to Suffolk Coleoptera, the geology and physical features of the county, and, at the end, a comparative table showing the number of species in the different families found in Suffolk as compared with Norfolk and the whole of Great Britain. The number of species enumerated from Suffolk reaches a total of 1763. Altogether it is a most exhaustive, painstaking and valuable addition to the literature relating to our insular Coleoptera. Mr. Morley has gone, as should be done, to the very earliest records, and has taken much trouble to confirm and verify them, and has erected a satisfactory basis on which to build up future lists. We do not quite agree with Mr. Morley's idea of length of time. He says, writing about *Calosoma sycophanta*: "The first recorded specimen was taken several years ago," and goes on to say, "It was subsequently found near Southwold (Stephs., *Illus.*, 1827)". Mr. Morley appears to be mistaken about *Ayleus brunneus*, Gyll. not being British. He writes: ". . . but does not appear to have yet occurred in Britain . . . I know of no indigenous specimen." Fowler (*Col. Brit. Isles*) gives the following localities for it:—"Esher, Ashford (Kent), Cowley, Birdbrook (Essex), Forest Hill, Edgbaston, and probably Gloucestershire." We have taken it out of old wood infested by *Pentarthrum huttoni* in a cellar in Shoe Lane. On the whole, however, it is a very praiseworthy publication, and all coleopterists interested in the geographical distribution of our British species should obtain a copy.

We understand that it has been decided by the authorities of the City of London Entomological and Natural History Society to commence the publication of the long-promised London lists of Lepidoptera and Coleoptera with the next part of their *Transactions*. Mr. Prout and Mr. H. Heasler respectively have undertaken to bring the lists up to date, and will doubtless be glad to hear of all recent records for the district. The limits of the district are as published in *Entom. Record*, vol. iii., pp. 63-69, a circle of about ten miles from Charing Cross. Communications on the subject should be addressed to Mr. L. B. Prout, 246, Richmond Road, N.E. (Lepidoptera); Mr. H. Heasler, 50, Aytoun Road, Brixton, S.W. (Coleoptera).

Mr. L. de Nicéville, the well-known lepidopterist, who has been on a visit to England for the past two months, was at the meeting of the Entomological Society of London on June 7th. He returns to Calcutta very shortly.

Mr. Champion (*Ent. Mo. Mag.*, June) points out that the insect figuring under the name of *Phytobius quadrimodorus*, Gyll., in British collections is really *P. muricatus*, Bris. He also records several specimens of *Stylops melittae*, Kirby, from his garden at Woking in May. Mr. F. H. Day records the very rare *Lebia crueminor* which he took on April 15th, 1899, in a meadow near Carlisle.

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The Lepidoptera of the Little St. Bernard Pass.

By J. W. TUTT, F.E.S.

I had moderately well dissected the lepidopterological treasures of Bourg St. Maurice for rather more than the preceding week, and so, on the early morning of August 3rd, 1893, I was up betimes, ready to catch the five o'clock diligence to the summit of the Little St. Bernard, and renew my acquaintance with the beautiful Alpine scenery which clusters around the upper Val d'Isère as one makes the first part of the charming ascent up the lengthy zigzags that lead to the Hospice of the Petit St. Bernard. One's delight on revisiting some of these charming Alpine nooks can readily be imagined, and with a balmy, sunny morning the sum of human happiness may be considered well nigh complete. Of course, entomologically, a rapid rush over a pass when one has to keep pace with the diligence carrying one's luggage, does not conduce to a very thorough exploration of its entomological treasures, and even if one cuts off the long windings of the zigzags it does not leave much time for rumination. One wet and unsatisfactory day entomologically, was spent at the Hospice at the summit (I still live in hopes that I shall some time or other get a fine day there), whilst the next day I started ahead of the diligence, and collected over the ground on the Italian side in a hurried sort of way until I reached the village of La Thuile, where I joined the diligence, after a haggle as to whether I ought to pay for the pleasure of walking from the Hospice to this village, and then went on to Pré St. Didier.

The lepidoptera observed were not numerous, rather, perhaps one ought to say, the species were not numerous, for, here and there, the number of specimens of *Cidaria celsiata* and a few other species was almost incredible. Making the ascent from Bourg St. Maurice I captured several fine *Hipparchia semele*, almost of the *aristarus* form, whilst *Melanargia galathea* was in fine condition up to some 5,000ft. above sea level. In the early morning *Setina aurita* was flying most abundantly in the sunshine, whilst *Nudaria mundana* similarly hung about the hedgerows and banks for the first thousand feet or so of the ascent. *Crambus culmellus* and *Acidalia flaccolaria* were in great abundance for a considerable distance up the slopes, occurring sometimes in countless myriads, still, perhaps, less abundant than I saw them at Le Lautaret in 1896. The way these species flit about among the damp dewy grass, in the early morning, is very interesting. They will congregate in millions about the tops of the grass culms from

about six to nine a.m., provided the air be moist and hot, with or without sunshine. *Scoparia sudetica* started from the rocks, and *Aciptilia tetradactyla* was on the banks with *Crambus culmellus*, flitting about, though much less actively, whilst *C. perlellus* appeared to be local, but with somewhat similar early morning habits. *Polyommatus corydon* went up to about 5,500ft., as also did *Pararge maera*, whilst *Melitaea athalia* was in good condition at quite the same elevation, although *Brenthis amathusia* was much worn. *Argynnis lathonia* went considerably higher, wary, and difficult to net as usual. *Chrysophanus phlaeas* reached not only to the summit of the pass, but, 500ft. to 1,000ft. on the mountain slopes above the Hospice, I captured a full-sized, though hardly a full-coloured, example. *Macroglossa stellatarum*, too, evidently makes the journey of the pass, and voyages from France to Italy as a morning outing. I found larvae of this species up to quite 5,500ft. elevation. I picked up an odd *Fidonia brunneata* on the way, I daresay plenty could have been obtained if worked for, and a single example of *Botys alpinalis* also occurred as I walked along, whilst, nearer the summit of the pass, *Larentia caesiata* replaced the lower-loving *Eubolia bipunctaria*, and *Brenthis pales*, with a pale brown female (not dark), became abundant on the waste grassy places. At about 5,000ft. elevation I found what I take to be *Erebia scirpio*. There was no time to make a big haul, although no doubt one could have done so, and my examples are not of the best. *Syrichthus alveus* was observed occasionally all the way up to the summit of the pass, and, on the next morning, three, with very small white spots on the upper side and of a rather brown ground colour, were captured, at quite 1,000ft. elevation above the Hospice. Around the Hospice, in the afternoon, *Anthrocera exulans*, very bright coloured and the females particularly bronzy, was booming about in all directions, whilst the little black Geometrid, *Pygmaena fusca*, was exceedingly abundant, and a rather pale form of *Brenthis pales*, not uncommon. There was, however, no very great variety of insect life on the ground traversed, although a few *Erebia lappona*, in moderate condition, were very welcome. The next morning huge clouds drifted along, shutting out the sun for a time, and then all would be clear again. There was, however, a distinct chilliness in the air, and as I set out for one of the higher slopes, I had some misgivings as to the continuance of even these temporary fits of brilliancy. I passed the ground traversed the previous afternoon without seeing *Pygmaena fusca*, *Anthrocera exulans*, or *Brenthis pales*, and skirting two or three large masses of snow, reached a flower-covered ascent leading up to a low grass-covered peak. On this *Erebia lappona* was not uncommon, *Syrichthus alveus* occurred, as also *Stenopteryx noctuella* (*hybridalis*), several Pyrales. *Crambus radiellus*, the beautiful *C. luctiferellus*, and *Fidonia carbonaria*, and then, having reached what appeared to be the summit of the grassy ascent, I found myself on a steep rocky incline, leading up to the higher peaks behind. Over the grass in the seams gullies *Erebia lappona* was fitting, and a much more active fellow, which I soon spotted as *Erebia gorge* ab. *erynnis*, in abundance. This insect I much wanted, three were captured, and I knelt to pin my victims. An icy blast swept the mountain-side, the sun was blotted out, and I shivered as the cold went through me. Bank on bank the fog came on, covering one with dew-drops in no time. I searched the rocks for *E. gorge*, but nothing could I find, and

I sat and pondered as to the best means of making a safe descent. I calculated that the most satisfactory way was to sit down until the cloud had passed, but the cloud never did pass, or at least if it did another overtook it before I distinguished the end of it. It was just one interminable driving fog, travelling at race-horse speed, and I was among the Alpine clouds. I packed up my net so as not to distract my attention, and listened for the cow-bells down in the valley near the Hospice. For a time I kept to the grassy flowery bank, that had a short time before been so gay and full of life. Now the flowers were closed, everything was still, and the water hung in drops on every blade of grass. I failed to hit the snow patches, so I set my face in what I surmised must be the direction of the Hospice, and carefully went down the incline straight ahead. Soon the clouds got less dense, one could see a greater distance ahead, and gradually the thick cloud changed for a driving penetrating rain. Another hundred feet or so down and the Hospice came in sight; but the rain never ceased for that day, and further collecting was out of the question. The next morning was again threatening, dull, and very cold, so I determined to leave the higher levels and get down to the more tropical regions at the foot of the mighty Grammont, and explore again those delightful old haunts that I described a little time ago in my *Rambles in Alpine Valleys*. The collecting between the Hospice and La Thuile is beyond description. The clouds cleared off at noon, and the sun shone out in all its brilliancy. The Alpine Pyrales and Geometrids were in thousands on the higher meadows, and as I left the road and took a footpath leading through the woods, on my right, direct for La Thuile, the wealth of insect life was amazing. *Erebia goryae* ab. *erynnis* appeared again, and then thousands of *Erebia euryale*, *Brenthis pales*, and all the common insects of this level. The insect, however, of the rocks, was *Larentia carviata*. This species was simply in myriads, great large grey individuals, with an amazing turn of speed and exceedingly wary; *Clisiocampa alpina* (a dark brown female just emerged), and then, lower down, a haunt for *Parnassius delius*, which reminded one much, on the wing, of *Aporia crataegi*. Still I was walking against the diligence, and I could hear the bells, now near, now far, as they rounded the zigzags, whilst I fired straight ahead. At last I came in full sight of La Thuile and its rushing river. I had overshot my mark a little, but made a bee-line for the village. Soon I found myself on the skrees of a very steep slope, and selecting a couple of fairly large flat stones, I fixed my feet and went down the slope at a tremendous pace, landing quite safely among the wild raspberry bushes at the bottom. I climbed one or two low stone walls, and found myself on the outskirts of La Thuile, and after losing myself repeatedly in the narrow alleys that serve for streets in Alpine villages, I ultimately found myself in the road near the bridge, minus, I found out afterwards, a fair share of the boxes in which I had put my afternoon's captures. A few hundred feet above me I could see the Customs' officer overhauling my baggage, under the superintendence of Signor Bown, an Italian doctor of science, whose acquaintance I had made at the Hospice. A mile and a half of zigzags, however, extended between my position and that of the diligence, and so I sauntered slowly over the bridge and into that part of the town lying on the other side of the river, the lovely feeder of the Dora, that breaks through the mountains behind Pré St. Didier.

My friend had seen my collecting cases safely through the hands of the Customs' authorities, and as the sun was now going off the narrow and enclosed lower valley, I took my seat and journeyed on by diligence to Pré St. Didier.

On the unity of the Psychidae.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

By *Psychidae*, I here mean the species placed by Bruand in the genus *Psyche*, with the synonyms "*Psyche*, *Fumea*, *Taleporia*, *Solenobia*, and *Canephora* of Stephens, Duponchel, Zeller, &c.," together with any others, obviously co-familiar with them. Others, besides Bruand, have kept them together, but not a few systematists of authority, like Barrett in his *Lepidoptera*, Staudinger in the list of *Lepidoptera* which he publishes annually, and Meyrick in the *Hand-book*, divide them, to use the old phraseology, into a Bombycid and a Tineid family, which they place as far apart as they can. Curiously, they are not agreed, however, as to how to divide them, Stainton, Barrett, and Staudinger making Bombyces of the Fumeas, Meyrick giving these to the Tineas.

I collected some material to elucidate the matter a few years ago and had to thank many correspondents for living and other specimens. I fully satisfied myself that the Psychids (*Psyche*, Bruand) were a very distinct group with no relationship to any other, except through its lowest representatives, to *Tinea* (*pellionella*) or more likely one of the Aculeate-Lepidoptera (*Adelidar*). I waited, however, for more material before attempting to convince others. Mr. Tutt, however, objects to things being left to the Greek Kalends, and has stirred me up, *apropos* of his new volume, which is to contain the Psychids, and has also supplied me with a good deal of material to revive and extend my previous observations.

One might no doubt write a good deal on the question, but there are a few salient and crucial points that do not require much verbosity for their statement which appear to me quite to settle the matter.

I may say that I have paid most attention to the pupa, but have incidentally considered the larvæ, and it is the characters presented by these, that divide the family clearly from any other that I have examined, and at the same time prevent any division at any point, except into subfamilies.

The division adopted by Stainton, Staudinger, and Barrett has, I think, most to be said for it.

The pupæ of *Psyche*, *Fumea*, *Epichnapteryx*, &c., are almost exactly alike, and differ from the pupa of *Solenobia* in some definite respects. All, however, have the first two abdominal segments fixed, and the third is fixed ventrally and movable dorsally, *i.e.*, there is an inter-segmental membrane dorsally that is functional, but not ventrally, the movement allowed by the dorsum, taking effect ventrally, by flexion only of the dermis, and 4, 5, 6 (and 7 in male) complete the free segments.

The pupæ of the *Psyche* division have the head bent very forward, making the mesothorax the anterior portion of the pupa (♂). Its more special and distinguishing character (♂) is to have a posterior

set of hooks to certain abdominal segments, so placed on the inter-segmental membrane, that they curl out of sight in the movement of the segments, and as they sweep round, they no doubt act as levers as well as fixed points of prehension of the case, and also seize the silk of the case, against the hooks (anterior) of the following segment, like the teeth of a set of forceps. They have also (σ) two hooks on the 10th abdominal segment pointing ventrally and carried forwards, these are ventral (not dorsal, and therefore not cremastral) appendages, and are very probably a persistence of the anal prolegs of the larva. The females are without the anal hooks and spines.

The Taleporias have not the head bent so far down, and they have none of these hooks like *Psyche*, but are distinguished by having (both σ and φ) two minute recurved hooks on the dorsum of the last segment—these, again, are probably not cremastral, being rather far forwards. So far, then, as the pupa goes, there is some ground for the Staintonian division.

When we come to the larva, we find in *Psyche* that there is a very special and unusual arrangement of the dorsal tubercles, the trapezoidal tubercles (i and ii of Dyar) are still trapezoidal, but the anterior are no longer inner, but outer, sometimes very far out. I do not know of any exception to this in *Psyche*. In the Taleporias are some with fairly normal trapezoidal tubercles, some with them nearly square, and some with them decidedly Psychine in their position. Again, at first sight at least, there is here something in favour of separating the Taleporiids, but, curiously, there are two (or more) species that bridge over the difference. Mr. Tutt proposes to erect these into two new genera, on the larval and pupal (and some imaginal) characters under the names of *Luffia* and *Bacotia*. My own opinion is that they represent a separate subfamily. In *Luffia lapidella* and *Bacotia sepium*, which are clearly Taleporiids by the male pupa, the female pupa is spineless as in *Psyche*, whilst the trapezoidal tubercles are reversed to a degree that is uncommon even in the highest Psychids. It is notable also that the anterior spines on the pupal dorsum are a single row as in *Psyche*, and not a patch of several rows as in *Taleporia*.

In *Luffia* we have then a combination of both Psychid and Taleporiid characters that prevent any division being made here. The larval tubercles and the peculiar spinous armature and hooks of the male pupa forbid any division between *Psyche* and *Fumea* as made by Meyrick.

Meyrick's division appears to be founded on the posterior tibial spurs. There is, in the case of *Psyche*, a purely secondary loss of these spurs in the higher division, due entirely to the impediment they are to the male in his approach to the female, and there seems little doubt that this is facilitated in some species by the posterior legs being introduced within the case, to which the posterior spurs would be a complete bar. The lower Psychids (*pulla*, &c.) still possess the spurs, although the female does not emerge from the case. When the female emerges (*Fumea* and *Taleporia*) the spurs are immaterial.

I might say a good deal about the general similarities of cases, habits, larval form and markings, &c., but though these are very strong points, they are not conclusive, whilst those more definite points I have mentioned, I think, are so.

The British *Psychidae* would then form the following subfamilies:

- I.—Male pupa with anterior hooks and intersegmental spines.
 - 1.—♀ without appendages remaining in case.
 - a.—♂ without posterior tibial spurs .. I. PSYCHINAE.
 - b.—♂ with posterior tibial spurs .. II. EPICHOPTERYGINAE.
 - 2.—♀ with legs emerge from case .. III. FUMEINAE.
 - II.—Male pupa with posterior hooks.
 - 1.—Female pupa without posterior hooks does not emerge from case .. IV. LUFFIANAE.
 - 2.—Female pupa with posterior hooks emerges from case .. V. TALEPORIANAE.
- OR
- I.—Larval trapezoidal tubercles reversed, ♀ pupa without anal hooks.
 - 1.—Male pupa with anterior hooks and intersegmental spines.
 - a. ♀ { ♂ without posterior tibial spurs I. PSYCHINAE.
 - in { ♂ with posterior tibial spurs .. II. EPICHOPTERYGINAE.
 - c. ♀ Emerges from case .. III. FUMEINAE.
 - 2.—Male pupa with posterior hooks .. IV. LUFFIANAE.
 - II.—Larval trapezoidals keep in usual order, or only slightly reversed .. V. TALEPORIANAE.

Diplodoma is Taleporiid. *Nysmatodoma* and *Psychoides* are not Psychids, but belong to a family originating in Adelids, with *Taleporia*, *Tinea*, &c.

It is clear, therefore, that wherever the lowest Psychids (*Taleporia* &c.) arose, they continued afterwards to be a separate stirps, and gave rise to no other families. Any comparison of the pupal characters with other families shows that they are allied only with certain Adelids or Tineids.

The anterior row of dorsal spines, which is a single row in the Psychids, may be paralleled in various Tineids and Adelids, as in many other pupæ, but in no other pupa that I have examined is the posterior row on the flexible intersegmental membrane as it is in *Psyche*, but always on the firm chitin of the solid segment. The ventral anal hooks certainly suggest that they have been derived from a persistence of the anal prolegs, and have originated in the family. The scars of the ventral prolegs are always strongly marked in all Psychid pupæ; a similar scar of the anal prolegs might easily give rise to these hooks. Similar hooks exist in some Adelids and Tineids, and may be identical in origin, but they generally seem a little more lateral than in *Psyche*, and are possibly of really cremastral origin.

In the Taleporiids, which are more closely allied to the Adelids and Tineids, we find the dorsal spines do not form a row, but a batch of several rows, similar to many Adelid subfamilies, but not occurring in *Tinea*, which has advanced to the single row. The anal hooks (dorsal on 10th segment) of the Taleporiids occur also in these same Adelids, so that the presumption is very strong that the Taleporias originated amongst the Aculeate-Lepidoptera fairly low down. *Tinea*, *Psychoides*, *Tischeria*, and others probably arose nearly at the same point.

In Psychid pupæ the maxillæ are reduced to a triangular wedge just outside the labial palpi, that are fully exposed. The maxillary palpi may be lost, but are generally represented by a short process at the outer angle of the maxilla. A similar condition of the maxillæ

exists in some Adelids. in others they are more fully developed, as they are also in *Tinea*.

Congenital Aberration of *Chalcusia venosa*, Walker.

By J. W. TUTT, F.E.S.

A very remarkable example of *Chalcusia venosa*, Walker, was exhibited at the meeting of the Ent. Soc. of London, on June 7th last, by Mr. E. E. Green. It was a female, from Udagama, Ceylon, and was captured in October, 1893.

This specimen has, on the left side, arising from the mesothorax, no fewer than three forewings. The first is narrower than the normal wing on the right side, but otherwise marked identically, and the neuration seems to be normal. The second is as large as the first, is similarly marked, but the rounding of the costa and apical margin, and other slight modifications, appear to have caused some little disturbance of the normal neuration. The third, which was spoken of at the meeting as a secondary hindwing, is apparently much smaller, crumpled, and practically inconspicuous, being hidden as it were beneath the others, and only noticeable as a somewhat irregular crumpled winglet on the under side. The metallic scales along the costa are, however, quite sufficient, apart from its position on the mesothorax, to determine it as a forewing. Had it been set out, as the others, it would have possibly had a much less shrivelled appearance. The wings on the right-hand side and the left hindwing are normal. The legs on the left side are all present, but the left mesothoracic one is somewhat aborted, possibly due to the pressure of the superfluous wing-material on it during development in the pupal stage.

In connection with this peculiar development, we may call attention to the parallel congenital aberrations of *Anthrocera filipendulæ*, *A. purpuralis*, *A. exulans*, *A. trifolii*, *A. lunicerae*, *A. occitanica*, &c., described in detail in my work, *British Lepidoptera*, vol. i., pp. 426-429. There is some alliance between the Chalcusiids and the Anthrocerids, and it is a noticeable fact that all the cases of extra wings developed in this group, so far recorded, have been on the left side.

The origin of these structures seems to be somewhat simple, and probably arises from the fission (or gemmation) of the wing-germ in the very earliest stage of its development. It is well-known that the multiplication of cells often takes place by fission, and that in many of the lower animalculæ it is almost the only method of reproduction. Given that the primitive wing-cell breaks up into two (or three) separate cells by this process, it is evident that either or all could produce a normal wing in the adult. The abnormalities of shape and structure are probably brought about (1) by nutrition, (2) by space requirements, of which the latter is by far the more important, for whilst nutrition would largely result in a difference of size and intensity of pigmentation, the latter would cause by the external pressure, modifications of shape, the two (or three) winglets having to accommodate themselves in the pupa, during their development, to the space normally occupied by the one wing, the outer one having the best chance of retaining the normal shape, a condition occurring in this example; the second being less normal, and the third forming little more than an elongated crumpled sac. This explanation also shows how the misshapen legs of this side

of the insect have been produced, *viz.*, by the abnormal pressure of the wings on the leg structure during the time of development.

The example of *Anthrocera eculans*, described *Brit. Lep.*, i., p. 427, is almost exactly parallel with the above, and has, in the same way, two additional winglets developed between the left anterior wing and the left mesothoracic leg.

Entomology at Hazeleigh (Essex).

By (REV.) GILBERT H. RAYNOR, M.A.

The following notes of what I have seen and done this year, until the middle of June, may perhaps prove of interest. The great feature of the season, so far, has been the abnormal abundance of *Macroglossa stellatarum*. They seem to be especially plentiful in the early morning and at dusk, at both of which times they are inclined to enter rooms. They do this at dusk evidently with a view to securing a safe resting-place till morning. They sit pressed close to the wall, right at the top where it meets the ceiling, and in this position are not very easily seen. I take it that these *M. stellatarum* are immigrants from Europe, as they can hardly have succeeded in hibernating here in such numbers. There will be abundance of food for their progeny, as I never remember seeing the hedges so festooned with luxuriant cleavers (*Galium aparine*) as they are this year. It is this species of *Galium* I presume to be their ordinary food inland, although I have taken the larva at Dover on *Galium verum* and at Sidmouth on *G. mollugo*. To go back to the beginning of the season, sawflies were not very productive. Although I took five *Taenioctampa populeti* in my own garden in 1898, I did not see it at all this year, but I took a single specimen of *T. miniosa* at plum blossom, and a fair number of *T. incerta* (very variable here), *T. rubricosa* and *T. gracilis*. *T. rubricosa* run very red compared with the form which I have been taking of late years (in Lincolnshire), and the *T. gracilis* we get seem to be somewhat small; one I took this year is beautifully suffused with pink and another is very fuscous. *Xylocampa areola*, which used to be common here, was represented by a single specimen hovering round sallow bloom on which it does not seem to settle down quietly as do the Taenioctampids. Early in April I instituted a successful search on tree-trunks for cases of *Taleporia pseudobombycella*, which, however, I could not find in any numbers. Later on, about the middle of May, I found them, together with various Psychid cases, in great profusion on the walls of a small black wooden shed (used as a luncheon-room by shooters) in the middle of Hazeleigh Wood. This wood, covering nearly 100 acres, and consisting chiefly of oak, with a considerable quantity of hornbeam, maple, spindle, hazel, &c., is splendid entomological ground, being the home of *Oenistis quadra*, *Nola strigula*, *Cochlidion arellana*, *Drepana binaria*, and *Lithosia sororcula*. The first two species have only occurred singly, several years ago, but the other three are not uncommon. Indeed I took no less than 44 *L. sororcula* in two afternoons (say four hours' work altogether) early this June, when they were in magnificent condition. My method of obtaining them is to beat the outskirts of the wood with a 9-foot pole on a really hot day, from five till seven in the afternoon being a very good time. They flutter gently out, from oak, maple, blackthorn and ash, but

never, in my experience, from elm. Sometimes they settle immediately on a leaf, but more generally they fly straight out from the wood into the open fields, at a height of some three or four feet from the ground and are then very easily captured. This pale golden species is extremely pretty and I shall never forget the sight of it in such unusual numbers. June 2nd and June 5th were lucky days, the latter being also marked by the capture in the same locality of *Eustrobia* (= *Acontia*) *luctuosa*, a species whose existence in this neighbourhood I never even suspected. I was working among some long grass in the corner of an uncultivated field chiefly for *Syrichthus malvae* and *Nisoniades tages*, when up got a black and white moth which I at first took to be an extraordinarily large specimen of *Ephippiphora cirsiaria*, after a short flight it settled on a thick grass stem, whence I easily netted it. I had never before seen this species alive, and was therefore almost more delighted by its capture than by the 21 *L. sororcula* I obtained during the next two hours. Butterflies have not been very abundant so far, except, perhaps, *S. malvae*, of which I obtained eggs by sleeving a female out on bramble in the sun, although I have repeatedly tried in vain in previous years. *Cyaniris argyrius* is fairly common: I generally obtain it settled on Portugal laurels in my own garden, but occasionally flying round ivy of which we have plenty. Holly does not flourish on our heavy clay here, but three miles away, at Danbury, *C. argyrius* and holly are both common. With me it generally oviposits on *Rhamnus frangula*. *N. tages* and *Brenthis euphrosyne* have certainly been much rarer than usual this year, and *Chrysophanus phlaeas* extremely rare. We get all the hair-streaks here except *Thecla pruni*, but *Callophrys rubi* and *Zephyrus betulae* are much more rare than formerly, although *T. w-album* is abundant in the larval state on wych-elms. I can generally get 30 or 40 in an afternoon towards the end of May, and reckon to get *Mellinia gilvago* in some numbers, at the same time. I find that worn females of *T. w-album* will lay freely if sleeved out on elm in the sun. *Zephyrus quercus*, although abundant as imagines, I never get very freely in the larval state. *Nemeobius lucina* occurs in a wood about four miles from here, but is now so uncommon that the imago is rarely seen. I generally get it in the egg state by collecting primrose leaves about the middle of June. The eggs are laid on the under surface of the leaf, generally one on each leaf, but I have found as many as five laid on different parts of the underside of the same leaf, and, in one instance, three laid together in a heap. They hatch at the end of June, and are easily reared, being full-fed at the end of July, when they turn to pupæ and remain in this state till the following May. As the result of an expedition on the afternoon of June 14th I found thirteen eggs, and hope to pay another visit to the locality shortly. In the same wood occurs that local and very lovely Micro, *Dasycera* (= *Ecophora*) *oliviella*, of which I took the first specimen this year on June 10th. It is by no means abundant.

Of the earlier Geometers the best species we get about here is undoubtedly *Aleucis pictaria*. By dusk along mixed hedges containing blackthorn one may get perhaps half-a-dozen a night, but by searching low blackthorn hedges about an hour after dark a much larger number may be obtained, often as many as two dozen; but to get them really fine is a different matter, as it is an extremely delicate species. It is not difficult to obtain eggs and rear the caterpillars, but the pupæ

seem apt to die off during the winter; possibly I have, as a rule, kept mine too dry. *Zonosoma annulata* occurs very sparingly, but *Z. porata* I have bred in considerable numbers from both green and putty-coloured larvæ beaten off scrub-oak on Danbury Common in September and October 1898, when they were exceptionally abundant. This is not a clematis country, but there are a few patches of the plant at Woodham Walter, three miles away, off which I annually obtain a few larvæ of *Iodis vernaria*. This year my score was eight plus a female imago of *Phibalapteryx ritualbata*—new to this neighbourhood—which laid me a small number of eggs. *Eurymene dolobraria* is a scarce species with us, and 1899 so far has only produced one specimen, bred from a larva beaten off oak last autumn. *Eupithecia venosata* is now emerging from larvæ obtained on bladder-campion at Danbury, and *Acidalia trigeminata* from ova obtained here last June. The only other Geometer of note is *Cidaria picata* of which fifteen magnificent specimens have lately emerged, being the progeny of a female captured flying along one of my own hedges on a very sultry July evening last year. Lasiocampids are represented by a larva of *Macrothylacia rubi*, found wandering on a road at Danbury. This I put out on a patch of heather, covered with muslin and it is now in the pupal state enveloped in a very long shaggy cocoon. Of *Pocilocampa populi* I have beaten two larvæ from elm. *Nola cucullatella*, not generally common with us, has been fairly common in the larval stage, and there are plenty of nests of *Eriogaster lanestris* on the hedges. Among the Noctuids I have done far better, obtaining larvæ of *Cymatophora ridens* and *C. diluta* at Woodham Walter, and three imagines of *C. octogesima*, quite new to this locality, at sugar in my own garden—all three in grand condition. The same poplars (on which *C. octogesima* occurs) produce larvæ of *Tethes subtusa* and *Taeniocampa populæti* in small numbers. *Halena genistæ* has been far commoner than usual, my score being well over 20 this year. They lay very freely in chip-boxes, and I rear the larvæ on broom which I grow for the purpose. Of *Dipterygia scabriuscula* three specimens have visited my sugar, and of *Neuria reticulata* a most magnificent example on the night of June 17th. *Hylophila quercana* has been very scarce in the larval state, a large amount of oak-beating at the end of May producing three only, and not a single *Phorodesma baiularia*, although I got three in 1898, two of which emerged into most beautiful specimens. No one who has ever seen a bred *baiularia* can fail to appreciate its beauty. Towards the end of May I got plenty of larvæ of *Pterophorus galactodactylus* off burdock in Hazeleigh Wood, and the first imago emerged on June 17th. Very few plumes occur here, the only other species of note being *Agdistis bennetii*, which is common in the Maldon Saltings, as also is *Eupoecilia rectisana*. Among the smaller things, *Roxana arcuana* is very abundant flying round oaks and hornbeams, *Phocopteryx upupana* occurs among scrub-oak, *Argyrolepis dubisana* and *Chrosia tessarana* among wild-carrot and hawk-weed respectively, whilst *Pempelia hostilis* feeds on my own poplars. Of the Gelechiæ I have taken those two very pretty species *G. aleella* and *G. luculella*. *Taleporia pseudobombycella* are now (June 19th) fast emerging, and my first *Fumea roboricolella* came out yesterday (June 20th). Sugar is very fairly successful, *Aplecta advena*, and *Xylophasia hepatica*, being the two latest arrivals; *Mamestra anceps* is not uncommon, the form occurring here being very pale. In fact, two nights ago,

I at first sight mistook a large pale female for *Xylophasia lithoxylea*. *Grammesia trigrammica* is always very abundant here, and in each of the last three years I have taken a splendid example of *ab. obscura*, Tutt. Of the other named aberrations of this species *approximans* is rare, *evidens* rather common, and *semifuscans* (varying very much in the intensity of the clouding) of frequent occurrence. It is a most interesting species, and I much regret that I have only two rows, containing some forty specimens, allotted to it in my cabinet. On the 10th of June I was surprised to take at sugar a female *Agrotis puta*, as I have always looked upon this as an August species. She laid three eggs which, having changed colour, are, I presume, fertile. Do any of your readers remember taking *A. puta* before August?

Luffia lapidella, Goeze, a British species.—Notes on Luffia pomonae.

By J. W. TUTT, F.E.S.

In the *Mémoires des Insectes*, vol. iii., p. 183, pl. xv., figs. 1-6, Réaumur described and figured the species that Geoffroy, *Histoire des Insectes*, p. 204, no. 53, afterwards re-described as a "*Tinea lapidum involucro conico recurvo*." This species Guénée considered was the most common of all those found on old lichen-covered walls in Paris. There is no doubt whatever that Réaumur's insect is the same species as that obtained by Luff in Guernsey, by Banks in Purbeck, and by Richardson in Portland; the cases being identical. In the "Stainton" continental collection at the South Kensington Natural History Museum, there is an excellent series from Lyon, under the name of *lapidicella*, sent by Staudinger and Millière, and the insect agrees absolutely with the *pectinella* of Dup., *Hist. Nat.*, supp. iv., p. 512, pl. lxxxix., fig. 6. Stainton inserted a note under his series, suggesting that his examples might, although labelled *lapidicella*, be the *tabulella* of Guénée, as he thought *lapidicella* should have whiter hindwings and paler forewings, similar to two that Doubleday had from Guernsey. We have already discussed *tabulella*, Gn., = *sepium*, Speyer (*ante*, pp. 178-9), a very different species, although a Luffiid, belonging to a different genus, *Bacotia*. *L. lapidella* has been referred to by Banks (*Lepidoptera of Isle of Purbeck*, supp., 1889, p. 10) as *Solenobia triquetrella*, and by Richardson (*List of Portland Lepidoptera*, p. 180) as *Solenobia* ? sp. The peculiar extinguisher-like case is perhaps better likened to a cow-horn, pointed at apex with a wide open mouth, and the larva is of a highly specialised Psychid type, with tubercle ii nearer the median line than i, and differing widely from *Solenobia* and *Dissoctena*, not only in larval but in imaginal characters. We believe that no very detailed description of the habits and life-history of the insect has been published since Réaumur's time, but as Mr. Luff furnished us with an abundant supply of living larvæ this spring, we have been able to obtain a considerable amount of detail which will be published in due course. It would be interesting to learn whether any of the unknown larvæ and cases referred to the *Solenobia*, obtained from the old limestone wall between Conway and Llandudno and elsewhere, belong to this species. The case is quite unmistakable. The remarkable larvæ in "obconical" cases, obtained by Gregson at Howth, in 1870, that "produced thousands of young larvæ the next season," although he "did not breed the perfect insect"

and described (*Ent.*, vi., p. 409) as *Psyche hibernicella*, appear to belong to this insect.

The species which Stainton referred to repeatedly as *Solenobia pomonae* is also a *Luffia* (see the cases in the Stainton collection). Whether it be conspecific with *L. lapidella* one is not prepared to say, as the males have not yet been bred. The cases, however, are well distributed, having been obtained during the present summer by Whittle (Essex), Bacot (Broxbourne), Fletcher (Sussex), &c. It was the female of this species that Harding referred (*E. M. M.*, xii., pp. 208-209) to *Narycia melanella* as an apterous form. One doubts the reputed absolute parthenogenetic tendency of this insect and supposes that, given sufficient material and care in breeding, males would be obtained, as in the case of *L. lapidella*, this sex having been bred both by Mr. Bacot and Dr. Chapman during the last few days, from cases supplied by Mr. Luff, of Guernsey.

We suspect the Luffiids will not only divide up into two genera:—*Luffia* (type: *lapidella*) and *Bacotia* (type: *sepium*), but that the former contains a group of allied species that have yet to be worked out, Dr. Chapman having obtained cases of a probable third species from the neighbourhood of Locarno. We would suggest that, in collecting cases, they be obtained from a variety of situations, the larvæ of the sexes often taking up quite different positions when near pupation.

The "Extinct" *Chrysophanus dispar*.

By JOSEPH MERRIN.

The interest aroused by the study of extinct species is not confined to the ages when the mammoth and the *Plesiosaurus* rambled over the Liassic waters and deposits. The class Insecta has a long tale yet to tell, although albeit we have only sparse fossil impressions of Neuroptera and some few of the other orders of this great class. It seems fair to infer from the simple structure of insects that they abounded long ages before the higher orders of animals were developed, the frailty of their organisation fully accounting for the few remains they have left for our contemplation. Endowed with enormous fecundity and many protective resemblances, they have, despite their remote origin, apparently been able, without leaving many gaps, to show bravely in modern times. Their minuteness and power to assimilate the abundant pabulum around them may, to some extent, account for this. A terrific war has been waged against them by almost every other animal; but, in return, they have carried on a warfare equally fierce.

While entomologists in comparatively recent times have been able to record the discovery of many "new species," certain localities have been denuded of others. One of the finest and rarest of British butterflies, *Chrysophanus dispar*, has been pretty generally considered as extinct in this country, but still there seems to be a gleam of hope that the species still survives in some of its most ancient and secluded haunts. It would be a thousand pities to set the mere collector on the track of this fine species; but it would be interesting to know there is a possibility of its survival. I had a male and female, lately parted with, which are undoubtedly British, and which were taken in a locality not included in the fenny districts of its former haunts. As

these were given to me by the captor in 1855, it has been suggested that I should place the details on record. In that year, accompanied by the staff of the *Gloucester Journal*, of which I was sub-editor for 26 years, in celebrating their annual "waze-goose," or outing, we called upon Mr. Robert Biddle, of Monmouth, a friend of one of the party. He had a large case of butterflies and moths hanging up, which he had taken, and I was much struck with four specimens of *C. dispar* occupying a central position among them. I had then only recently begun to collect. On my drawing his attention to them he said he took them some time previously on the lower slopes of the Doward Hill, bordering the river Wye, not far from Monmouth. He seemed to set no great value upon them. My great admiration of them appeared to interest him, and I was delighted the next day on opening a small packet brought to the *Gloucester Journal* office by the Monmouth coach (there was then no railway) to find two specimens of the *C. dispar* I had admired, which Mr. Biddle said, in a short note, he was pleased to present to me. The appearance of these specimens, with their "poker" pins and slightly damaged antennæ, and the circumstances under which they were given to me, leave no doubt of their British origin. It is well known that the river Wye is subject to heavy floods, and that there is much marsh in and near its numerous and picturesque bends. This fact seemed to give force to the likelihood of the species being a remanet of its brethren who have been "improved" off their old localities. Moreover, the remains of ancient beaches of the river, with caverns, and bones of extinct animals at higher levels than the present waters, testify to the great geologic changes which have occurred in the locality.

Some year or two after *C. dispar* had pleasantly filled a blank in my cabinet, I made a three days' holiday tramp along the banks of the Wye from Ross to Chepstow, following its windings with the sketches of an amateur and the net of a young lepidopterist. In passing over the Doward Hill I reconnoitred the locality as far as I was able, and I saw much marsh land bordering the Wye, but quite unsearchable, unless shod with jack boots. In the hope of getting a better glimpse of the lower slopes of the hill, I rang the bell at the residential gate, but was politely told that as the family were away a stranger could not be allowed to examine the grounds, and I had to leave, with regret, 'neath a broiling sun, what seemed classic ground, and sought refuge in the shady streets of old Monmouth. I have traversed the river by boat, though not at the time when *C. dispar* ought to be due, but only remember to have seen swarms of beautiful dragon-flies sporting over its surface. This method of hunting for it might yield some good results if the numerous shoals and eddies in the river could be circumvented, and the holes in the bed avoided, in which many have been drowned.

Mr. W. F. Kirby, the well-known entomologist of the British Museum, has been lately communicated with in regard to this matter, and he writes:—"I have since heard that the insect has been seen flying in some almost inaccessible marshes, cut up by deep dykes, across which it is impossible to hunt them, somewhere near the sea in the West of England (I think somewhere in Cornwall). Mr. Merrin could have no object in misstating the locality of his specimens, and I see no reason to doubt it."

Notes from the New Forest.

By H. K. DONISTHORPE, F.Z.S., F.E.S., and W. J. KAYE, F.E.S.

The last Annual Whitsuntide Excursion of the Entomological section of the Leiceaster Literary and Philosophical Society was held at Lymington, within easy reach of the Salterns, New Forest and the Isle of Wight, Prof. T. Hudson Beare, Messrs. Bouskell, G. B. Chalcraft, A. M. Corah, Dixon, Horace Donisthorpe, C. B. Headly, W. J. Kaye, and Pearson, representing the Entomological section. The Angel Hotel was made the headquarters, and here everything was done to make the members comfortable. All were provided with bicycles and kodaks, and much ground was covered and many interesting "snap-shots" taken. Our energetic Secretary, Mr. Bouskell, had introduced a new departure, which turned out a great success. This consisted of a short after dinner paper to last ten minutes by different members with a discussion afterwards every evening, the most noteworthy being Mr. Kaye's "New Forest Lepidoptera to be searched for," Professor Beare's "Coleoptera of the Isle of Wight," Mr. Bouskell's "Notes on Aberrations, Varieties and Species," and Mr. Donisthorpe's "Some Notable New Forest Coleoptera." Of the captures made during the trip the best in the Coleoptera were *Collyrium elongatum*, by Mr. Bouskell, in the bark of oak infested by *Dryocates villosus*; *Haplo-nemus nigricornis*, by Prof. Beare; *Alesosa nubila*, by Mr. Donisthorpe; *Pediacus demestrides*, *Laemophloeus bimaculatus*, and *Mycetochares bipustulatus*, by Messrs. Bouskell and Donisthorpe; and a series of *Pterostichus dimidiatus* by all the party out of a sand pit. The Lepidoptera were notably absent. Imagines were rarely seen, a few *Cyaniris argioides* round the holly bushes and *Ematurga atomaria* on the heaths being the most frequent. Owing to the earliness of Whitsuntide and the backwardness of the season, *Macroglossa fuciformis* and *M. bombyliiformis* were not to be seen, and the rhododendrons were hardly showing a flower, where they are generally to be seen buzzing at the blossoms. Larvæ were most conspicuous by their absence. Where usually one observed thousands of *Hybernia defoliaria* and *Cheimatobia brumata*, three or four was the result of several slashings into the beating-tray. The larvæ of *Miselia oxyacanthæ* were fairly common on the lichen-covered blackthorn, but persistent beating of the sloe failed to yield a single larva of *Zephyrus betulae*. From oak a couple of *Phorodesma pustulata* were beaten out, but the larvæ of *Taeniocampa miniosa* and *Asphalididens* altogether failed to put in an appearance. In Ramnor enclosure a very few larvæ of *Imenitis sibylla* were taken by searching, and now and then an *Ephyra omicronaria* got up and was bagged. The larvæ of *Crocallis elingaria* were fairly common for those who wished to breed this cannibal larva. Dusking at Queen's Bower resulted in a few of the common Geometrids, the best of which was *Tigridia adustata*. From pine, larvæ of *Ellopija fasciaria* were taken full-fed, and in the near neighbourhood, where sometimes *Gnophria rubricollis* is so common, not a specimen was to be seen. Although the Lepidoptera taken were few in number, doubtless a month later there would be all the more to take, and, may it be added, it is highly satisfactory to consider that those species which are hard pushed for an existence have this year had a chance of recouping themselves.

What is the *Fumea betulina* of Barrett?

By J. W. TUTT, F.E.S.

The Fumeids fall into two very natural groups: (1) *Fumea*, the larvæ of which cover their cases with pieces of straws arranged longitudinally, and represented in Britain by *crassiorella*, *casta* (*nitidella*), *roborecolella*, and *salicolella*. (2) *Proutia*, the larvæ of which cover their cases with pieces of leaf and bark placed irregularly, and represented in Britain by *betulina* and *salicolella*. (There is probably a third species, males of which have not yet been obtained.)

The limits of the British species of *Fumea* are none too well known, but those of *Proutia* appear to have been complicated by Barrett's reference, to *betulina*, of an insect that does not satisfy Zeller's original description of the latter species. It may be well to refer to the original descriptions of these species before discussing the subject indicated by the title of this article.

(1) *Proutia betulina*, Zell., "Isis," 1839, p. 233.—There is here at Glogau, in a birch-wood, a species which, in the ♂, is so like *nitidella* that I have hitherto not been able to separate the two, but in the ♀ is distinguished by the almost snow-white hairs of the anal tuft, where *nitidella* has them grey; but more essential than this is the fact that my *P. betulina* differs in the larval case, which tapers conically behind, and instead of grass-stems is covered with rounded particles of white birch-bark and other leaf-like substances, &c.

(2) *Proutia salicolella*, Bruand, "Mon. Soc. Donbs," ii., livr. 1-2, pp. 65-66 (1845); "Mon. des Psych.," pp. 103-101 (1853).—Envergure du mâle, 12-13mm. Mas: Statura ferè *roborecolellae*; alis angustioribus, paululò longioribus. Femina: *Crassiorellae*, nequor *comitellae* affinis, sed minor. Larva: *Roborecolellae* vicina, at multo lucidior. Involuerum: Ut apud *anicanellam* (*betulina*), quisquilius lignosis vel corticeis indutum.—Le mâle ressemble beaucoup à celui de *tabulella* (*sepuim*), c'est-à-dire, qu'il est d'un brun-noirâtre luisant, avec les ailes bien plus allongées que *roborecolella*, et même que *comitella*. Il est un peu plus petit que cette dernière espèce, mais il a plus d'envergure que *roborecolella*. Les antennes sont très-légèrement pectinées. La femelle est extrêmement voisine de celles de *crassiorella* et de *comitella*; elle est cependant un peu plus petite. . . . La touffe anale est d'un brun-jaunâtre clair. La chenille de cette espèce vit sur le saule-à-lier, dont elle mange le lichen; son fourreau est recouvert de petits fragments d'écorce, de taille diverse et placés irrégulièrement. Ce fourreau, un peu resserré à l'ouverture, s'élargit légèrement au milieu et se termine en pointe obtuse.

Bruand redescribed Zeller's *betulina* under the name of *anicanella* (referring to the former as a synonym) and insisted very strongly on the character presented by the snow-white anal tuft of the female. Mitford, who evidently knew both *P. betulina* and *P. salicolella*, stated (*Ent. Mo. Mag.*, vi., pp. 94, 186) that Bruand's name of *anicanella* was very suitable for the species as the ♀ has the anal tuft of a snowy whiteness, whilst in the ♀ of *salicolella*, this part is not so white, particularly beneath, but it has a white bloom on the sides. He also correctly differentiates the males, stating that the fore-wings of *salicolella* are much elongated, whilst those of *anicanella*, on the contrary, resemble rather specimens of *P. intermediella*, &c.

In the *Ent. Mo. Mag.*, xxx., p. 267, Barrett described *betulina*, and states that ♀ specimens before him had not "snowy-white tufts." Evidently, as these specimens failed to agree with the original description of the species the logical conclusion was that the examples were not Zeller's (and Bruand's) species. On p. 268 the same gentleman says that three of Mitford's examples of *salicolella* (which are undoubtedly *salicolella*, Bruand, if they are those described *Ent. Mo. Mag.*, vi., p.

186) are in Dr. Mason's collection. He further states that "they do not represent this species, and the male is certainly *F. betulina*."

Now, since Barrett's idea of ♀ *betulina* (*loc. cit.*, p. 268) did not satisfy the description of Zeller's *betulina* (and Bruand's *anicanella*), and Mitford's *salicolella* equals Barrett's *betulina*, although Mitford's *salicolella* equals Bruand's *salicolella*, it is evident that Barrett's ♀ *betulina*, *Ent. Mo. Mag.*, xxx., p. 267 = Bruand's ♀ *salicolella*, and that Barrett's *salicolella* (*Ibid.*, 268) has no standing except so far as it is copied from Bruand, and hence ♀ *betulina*, Barrett, *Ent. Mo. Mag.*, xxxi., p. 267 = *salicolella*, Barrett, *Ent. Mo. Mag.*, xxxi., p. 268.

In the *Ent. Mo. Mag.*, xxxi., p. 275, is a further note on an insect captured by Mr. W. H. B. Fletcher in the New Forest, and referred to as *F. betulina*. Here Mr. Barrett makes sundry corrections in his previous description of ♂ *betulina* (copied from the authorities, and hence correct), which appear to bring it into line with the real description of *salicolella*. The living female is then described, and the anal tuft of this New Forest *betulina* is described as forming a dense circle of long brownish-white scales. Now, in the *Ent. Mo. Mag.*, xxx., p. 268, Barrett, following Bruand, had described the anal tuft of the ♀ *salicolella* as light yellow-brown, and yet it does not appear to have struck him that his New Forest *betulina* could possibly be the *salicolella* of Bruand. We have not seen the New Forest imagines or cases, and cannot say that this is so, but unless they represent something quite new and undescribed, it seems to be the only logical conclusion.

There is no doubt whatever if one will read Zeller's original description of *betulina*, *Isis*, 1839, p. 183, that the New Forest insect, referred to this species, does not agree therewith. On the other hand, there can be but little doubt (although there is much less certainty since Bruand's collection was destroyed) that the New Forest insect is *salicolella*.

It is further interesting to be able to show that Mitford was perfectly correct in his differentiation of the two species, and we would here congratulate Mr. Whittle, who has found cases of the true *betulina* this year, and allowed us to complete some dubious points in its life-history.

We may also note that the cases of *anicanella* in Stephens' coll. at the British Museum appear to be not those of *betulina*, Zell. (of which *anicanella* is a synonym), but of *salicolella*, Bruand.

Some further notes on *Zonosoma annulata* var. *obsoleta*.

By W. S. RIDING, B.A., M.D., F.E.S.

Some of the pupæ of the third brood of *Zonosoma annulata* (1898) described in the *Ent. Record*, vol. 10, No. 10, began to emerge on April 22nd, 1899, and as I brought them into a warm room, continued to come out till June 9th. Sixteen pupæ, apparently healthy, are going over, which is very unusual. All the imagines are destitute of the black ring on the fore-wings, so from these experiments alone, the probability would be that the form is a true variety and not an aberration, and this is rendered certain by second broods from three different pairings which have been emerging during June, all breeding true without exception.

The variety is establishing itself in the locality mentioned in this

neighbourhood, as I beat out a few larvæ from the maples in the hedges there last September, from which I obtained sixteen pupæ and two var. *obsoleta*, or 12·5 per cent. The spring forms are paler than the autumnal—a whitish straw-colour generally, with, on the forewings, intensification of the yellow on the dorsal border and at the lower part of the two median lines, and a dark and conspicuous shade between the two latter. Average expanse of wings 12"—13", as compared with about 11" for those of the brood that emerged in 1893. In eight, the ring on the hind-wing is incomplete, and in most there is a tendency to its greater angularity than obtains in wild specimens following the type. In two, it is so little marked that the variety would merge into the form *bi-obsoleta*, were it not for a few black dots. The ♂s were more in number than the ♀s, as might be expected from so many of the latter having emerged in 1893, but, taken altogether, the broods were represented nearly equally by both sexes. The sexes seem to emerge in no order of precedence but indifferently. There is one small aberration (10") in which the second line of the forewing is unconnected with the median which forms an independent shade, and the three lines of the hindwing are distinct, the first having a large ring with shaded edging resting on it externally, which has no homologous marking in any other specimen I have seen. The ordinary small ring is faintly represented as usual on the upper edge of the median line. More of the pupæ died during the winter than in previous years. I find single specimens of var. *obsoleta* have been taken in other counties besides Devonshire; one about ten years ago by Mr. Harwood, at Colchester, and another four or five years ago by Colonel Partridge, at Tunbridge Wells.

Migration and Dispersal of Insects: Odonata.

By J. W. TUTT, F.E.S.

McLachlan asserts (*Ent. Mo. Mag.*, vol. ix., p. 273) that "the dragonfly with the widest distribution is undoubtedly *Pantala flavescens*, Fab., which is found over the greater part of the globe, excepting in Europe, and that the next most widely spread species is *Tholymis tillarqua*, Fab., which is found in all tropical and sub-tropical Asia, Australia and Africa, in the islands of the Pacific, and even in Chili." In the latter part of April and May, 1856, he notes that he observed numbers of these species at sea during a protracted calm in the lower part of the China Sea. They did not settle on the ship, but flew leisurely at some little height over the surface of the water, apparently as much at home as if hawking over the paddy fields of the adjacent islands. The observer considered that they were "no doubt taking advantage of a (to them) congenial atmospheric condition, in order to make an over-sea journey. It would not be unnatural to suppose that the rivers of the country where they had been bred were dried up by the excessive heat, and that they were seeking localities favourable for the development of their future progeny," but, he adds, "this must not be taken for granted, because the familiar *Libellula quadrimaculata* of the temperate regions of the northern hemisphere is a notorious wanderer, without the excuse of a drought." There is a note (*Ent. Mo. Mag.*, vol. xxxii., p. 254) on the appearance of the same species (*P. flavescens*), far out at sea, on April 11th, 1896, at 11.0 p.m., when

numerous examples appeared in the chart-room and cabins of the P. and O. steamer "Victoria." At the time the nearest land to the vessel was "Keeling Island, N., 20 W., 290 miles, N.W. of Australia, S., 70 E., 900 miles." At the time the wind was moderate from eastward, with heavy rain. McLachlan adds that this record "is of especial interest, not only on account of the great distance from the nearest land, but also because the "insects were observed at night and during heavy rain." The power of continued flight suggested by this observation is sufficient to explain the distribution of the species over the whole intertropical zone, and far beyond it on either side, and yet, notwithstanding its considerable size, it appears to be an insect of weak organisation, the chitinous exoskeleton being of thin texture.

It may be well to note here that when Mathew visited the estuary of the river Ouro, on the West Coast of Africa, lat. 23° 40' N., in December, 1881, he found a large dragonfly, *Anax ephippiger*, in the greatest profusion, although there was no sign whatever of fresh water in the neighbourhood, nor had there apparently been any rain for many months. These dragonflies flew off to the ship in considerable numbers, and at night might be seen reposing on the various ropes, whilst shortly before dusk, on the sand ridge at the mouth of the estuary, they were noticed congregating in vast numbers on the bushes. Although the estuary was explored for some twenty miles or more inland, there appeared to be no sign of fresh water, and it would appear that the Ouro was a river in name only. *Pyrameis cardui*, *Choerocampa celerio*, and *Heliothis armiger* were (besides an *Agrotis* resembling *ripae*) the only Lepidoptera observed.

In La Plata the pale blue *Eschna bonariensis* frequently occurs on the pampas in enormous flocks, which usually appear just in advance of the violent storm-wind called the "pampero." In the *Naturalist in La Plata* we read:—"Inasmuch as these insects are not seen in the country at other times, and frequently appear in seasons of prolonged drought, when all the marshes and water-courses for many hundreds of miles are dry, they must of course traverse immense distances, flying before the wind at a speed of seventy or eighty miles an hour As a rule they make their appearance from five to fifteen minutes before the wind strikes; and when they are in great numbers the air to a height of 10ft. or 12ft. above the surface of the ground is all at once seen to be full of them, rushing past with extraordinary velocity in a north-easterly direction All journey in a north-easterly direction, and of the countless millions, flying like thistle-down before the great pampero wind, not a solitary traveller ever returns." These flights occur during the summer and autumn, and Mr. Hudson thinks the cause "is probably dynamical, affecting the insects with a sudden panic, and compelling them to run away before the approaching tempest. The mystery is that they should fly from the wind before it reaches them, and yet travel in the same direction with it On arriving at a wood or large plantation they swarm into it as if seeking shelter from some swift pursuing enemy, and on such occasions they sometimes remain clinging to the trees while the wind spends its force." Walker states that in the estuary of the Rio de la Plata the sight of numbers of dragonflies (often met with when the land is so far off as not to be visible) is always regarded by the local mariners as the harbinger of a "pampero," and measures are taken

accordingly, as the wind is very dangerous. Hagen states that he learned to his cost that large flights of dragonflies occur in tropical Brazil. He observes that he requested a collector in Brazil to catch some dragonflies for him, and at last a box arrived, with a large number of specimens, all, however, of three species, and accompanied by the naive remark that the creatures sent had "flown past his house in crowds."

In Wisconsin it is recorded that a somewhat regular migration of dragonflies take place, occurring generally for a day or two each year. According to Hagen, to whom Uhler of Baltimore sent examples, the migrating dragonfly of Wisconsin is *L. quadrimaculata*, and identical with the European species, but that this is not the only migrating species there is clearly proved by a notice by Brown in *Insect Life*, who states that, in September, 1890, he observed *Æschna eremita* flying in swarms in the same direction on successive days, and further notes that he had observed them for several years previously (although he had not kept any detailed observations) for one or more days each year on flight, at Sheboygan, Wisconsin.

With regard to the earliest records of the migrations of dragonflies, the most important of these were collected by Van Bemmelen ("Waarnemingen over het trekken van Insekten," in *Handlmg. d. Nederl. Entom. Ver.*, 1857, iii., pp. 1-20). The work appears to be carefully done, and the records include thirteen references to *Libellula quadrimaculata*, three to *Platetrum depressum*, and one to *Agriion* ? sp. The years in which dragonfly migrations have been noticed are 1681, 1740, 1744, 1746, 1775, 1779, 1816, 1830, 1839, 1852, 1853, 1854, and 1855, and, of these, Hagen notes that 1746 is the only one of the years mentioned by Keferstein as characterised by "locust" (Orthoptera) migrations. The notices of Fischer in 1779, of Von Bock in 1775, and of Hagen in 1830, all referring to *Libellula quadrimaculata* are omitted, and it would appear that the oldest known record (Jachmund, *Ephem. natur. curios. Acad. Leop. Dec.*, iv., p. 243) was also unknown to Bemmelen: this was the occurrence of an immense swarm of probably *Libellula quadrimaculata*, observed May 18th, 1678, at Hildesheim flying from north to south. This notice greatly antedates that of the Abbé Chappe d'Auteroche (*Voyage*, &c., 1768, p. 286, and *Beckmann's Phys. Oct. Bibl.*, p. 5) who saw the Tobolsk swarm, to which we have already referred, in 1761. Another swarm of *L. quadrimaculata* is noted (*Foriep Notz*, 1825, p. 10) on June 19th, 1825, near Malta and Magdeburg, and Speyer suspects that the Tobolsk swarm was of the same species.

ORTHOPTERA.

SWIMMING OF *TETTIX SUBULATUS*.—Apropos of my paper on "Aquatic Orthoptera" (vol. x., p. 266) it may be of interest to note that on May 29th last I took a *Tettix subulatus*, swimming on the surface of a sluggish stream, that was full of animal life. At first I could scarcely imagine what it was, for the motion was entirely different from that of the common surface insects. It was swimming towards the shore, with powerful strokes of its hind legs, and had doubtless fallen in by accident.—MALCOLM BURR, F.Z.S., F.E.S., Bellagio, East Grinstead, May 30th, 1899.

COLEOPTERA.

Notes on the additions to the British List of Coleoptera since Canon Fowler's "Coleoptera of the British Isles."

By HORACE DONISTHORPE, F.Z.S., F.E.S.

(Concluded from p. 186.)

Epuraca nana, Reitt.—Champion (*Ent. Mo. Mag.*, vol. xxxii., p. 4). Taken by Mr. Champion, at Thorpe-le-Soken, in Essex, by sweeping.

Rhizophagus oblongicollis, Blatch.—Blatch (*Ent. Mo. Mag.*, vol. xxviii., p. 303). Taken by Mr. Blatch under oak bark in Sherwood Forest.

Telephorus figuratus ab. *cruachanus*, Chitty.—Chitty (*Ent. Mo. Mag.*, vol. xxix., p. 142). First taken by Mr. Chitty near Ben Cruachan, by sweeping in damp places; on a later visit the aberration and type were observed flying about together and interbreeding, the aberration, possibly, more abundant than the type.

Clytus mysticus ab. *hieroglyphicus*, Hbst.—Donisthorpe (*Ent. Record*, vol. x., p. 303). Taken at Chester by Mr. Newstead. Exhibited at the meeting of the Ent. Soc. of London, October 5th, 1898, by Mr. J. J. Walker.

Oberia oculata ab. *quadrinaculata*, Donis.—Donisthorpe (*Ent. Record*, vol. x., p. 303). Taken by Professor Beare and myself in Wicken Fen.

Orsodacna cerasi ab. *glabratus*, F.—Champion (*Ent. Mo. Mag.*, vol. xxxiv., p. 176). From Matlock.

Cryptocephalus bipunctatus ab. *thomsoni*, Weise.—Champion (*Ent. Mo. Mag.*, vol. xxviii., p. 193). Probably in some instances confused with *C. biguttatus*, Scop., in British collections. Taken by Mr. Champion, at Woking, by sweeping among tallows.

Cryptocephalus parvulus ab. *barbareae*, Steph.—Champion (*Ent. Mo. Mag.*, xxxiii., p. 90). Taken by Mr. Bennett and myself, at Battle, by beating young birches.

Apthona nonstriata ab. *acnescens*, Weise.—Champion (*Ent. Mo. Mag.*, vol. xxxv., p. 15). Taken by Mr. B. Tomlin, at Candleston, and by Mr. J. J. Walker, between Pembroke and Tenby, on *Iris pseudacorus*.

Palorus subdepressus, Woll., and *P. ratzeburgi*, Wissm.—Champion (*Ent. Mo. Mag.*, vol. xxxii., p. 27). Granaries, &c.

Hypophloeus linearis, F.—Heasler (*Ent. Record*, vol. x., p. 7). Taken by Mr. H. Heasler, in the burrows of *Tomicus bidens*, under bark of felled pines, at Oxshott.

Anaspis ruficollis ab. *alpicola*, Emery.—Champion (*Ent. Mo. Mag.*, vol. xxxi., p. 207). Taken by Messrs. Waterhouse, at Putney.

Anaspis latipalpis, Schilsky.—Champion (*Ent. Mo. Mag.*, vol. xxxiv., pp. 101-103). Confused with *A. subtestacea*, Steph., in collections.

Otiorrhynchus auro-punctatus, Gyll.—Champion (*Ent. Mo. Mag.*, vol. xxxi., p. 133). Taken by Mr. Halbert, near Dublin, on the coast, and in the counties of Dublin, Meath, and Louth, in moss, also by beating hedges and trees, and by sweeping.

Ecomias pyrenaicus, Shall.—Champion (*Ent. Mo. Mag.*, vol. xxxiii., p. 134). Taken by Mr. J. H. Keys, in the Plymouth district, at roots of grass, in faggots, under bark, and by sweeping.

Cionus longicollis, Bris.—Champion (*Ent. Mo. Mag.*, vol. xxx.,

p. 100). Taken by Mr. Moncreaff, at Portsdown, on *Verbascum thapsus*.

Hister quadrimaculatus ab. *gagates*, Illiger.—This aberration, which Crotch introduced into his first catalogue (1863), must be re-inserted into the British list. It is a totally black form of *quadrimaculatus*, and the description is as follows (*Magazin für Insektenkunde*, Karl Illiger, Sechster Band, 1807, p. 31): "Labro acuminato; thoracis lateribus sesquis-striatis; elytra immaculatis striis lateralibus quatuor; marginali antice abbreviata; tibiis anticis tridentatis; dente apicis integro." In the European catalogue (1891), *aethiops*, Heer, is given as a synonym of *gagates*, Ill., and Fowler (*Col. Brit. Isles*, vol. iii., p. 200) says of *quadrimaculatus*: "black with a large crescent-shaped red spot on each, which is very variable in shape, being often interrupted and forming four patches, and sometimes being absent altogether (v. *aethiops*, Heer)." I prefer to use the name *gagates*, Ill., because Heer in *Fauna Coleopterorum Helvetica*, 1888, p. 452, separates *aethiops* from *quadrimaculatus* thus:—

(a) Elytra striis marginalibus duabus, exteriore vero-brevissima—*H. aethiops*, Heer.

(b) Elytra stria marginali unica interiore, exteriore deficiente—*H. 4-maculatus*, L.

So that *aethiops* cannot be the same as *gagates*, Ill. I have obtained Continental specimens which do not show any trace of two marginal striae on the elytra. Mr. Walker has compared his British specimens with one of these, and he tells me that they agree perfectly. He captured two or three examples under flood refuse at Iwade this year. Professor Beare and I had the pleasure of collecting there one day with him, when *Hister 4-maculatus* turned up in some numbers and many variable forms occurred; we, however, were not fortunate enough to obtain the totally black aberration, our most extreme forms having only an evanescent red patch on the bend of the elytra. The ab. *gagates* must be comparatively very rare in Britain, as I can find no other records (except Crotch's catalogue) and there are no specimens in the Stephensonian or Power collections.

Ceuthorrhynchus querceti, Gyll.—Champion records (*Ent. Mo. Mag.*, xxxv., p. 142) this species as an addition to the British list, from specimens captured by Messrs. Edwards and Elliman and the late Mr. J. A. Brewer, in Horning Fen.

Harpalus latus, L. ab. *erythrocephalus*, F.—Newbery, *Ent. Mo. Mag.*, xxxv., p. 159. Taken by Mr. W. F. Sharp in some numbers under flood refuse on the banks of the river Lleidr, Dolwyddelen, Carnarvonshire. Here the aberration formed 75 per cent. of the captures and thus far outnumbered the type.

[ERRATUM.—*Harpalus froelichi*, ante, p. 138. The insect was taken in May, 1897 (not 1898), by Messrs. Morley and Elliott (not Ellis).]

CURRENT NOTES.

Some years ago we had occasion to find fault with the procrastination of the South London Entomological Society in the matter of the publication of its *Proceedings*. Under its present secretaries the old order has changed completely, by degrees arrears have been overtaken, and for the last two years the *Proceedings* have been pub-

lished in two half-yearly parts, one as soon as possible after June, the other after the annual meeting at the end of January. From the Presidential Address we learn (p. 83) that the *Proceedings* have cost the paying members 8s. 10d. each, and this volume is offered to the public at 3s. The volume consists of 192 + xvi pp. 8vo., of which 83 are occupied by special papers, the remainder with an Abstract of the Proceedings. The whole of the material is original, and should be in the hands of every working entomologist in the country. The original papers are as follows: (1) "The Lasiocampids," by J. W. Tutt, F.E.S., a critical review of the group, from various standpoints, with special reference to the British species. (2) "The British species of Lepidoptera occurring in Japan," by R. South, F.E.S., a general paper on the subject. (3) "Notes on Collecting British Hemiptera," by E. Saunders, F.L.S., F.E.S., one of the best general papers on the subject that we have ever seen; this might have been expected, from the authorship of the paper. (4) "Notes on some South European Lepidoptera, with remarks on *Thais* and *Euchloe*," by A. H. Jones, F.E.S., a first-class paper, and one that no visitor to the Riviera, or collector of European butterflies can possibly afford to be without. (5) "The scientific aspects of Entomology," by J. W. Tutt, F.E.S., a critical review of various phases from which the subject can be studied, with many details as to classification, external structure, wing-formation, scale and pigment-formation, metamorphosis, &c. (6) "Lazy days by the sea (chiefly concerning Lepidoptera)," by R. Adkin, F.E.S., an excellent paper, teeming with observations on the habits of certain Lepidoptera at Eastbourne. (7) The Address of the retiring President, J. W. Tutt, F.E.S., "The Study of Natural History—The Variation of Lepidoptera—The Origin of Species," &c., are among the subjects treated in a lengthy essay of 26 pages. The compilers of the Index deserve our hearty thanks. It is much more complete than that given to us by any of our contemporary entomological magazines, and those who have the future work of compiling lists illustrating the geographical distribution of species will have cause to be grateful. We have already appealed to the goodwill of our subscribers to support the City of London Entomological Society, not altogether without success, as the Council is now in a position to go on with its valuable work, and some new members have been enrolled. We would ask that the same generous treatment be meted to the South London Entomological Society, in so far as becoming members and purchasing the *Proceedings* are concerned. By becoming members entomologists will be helping a worthy object in which they are supposed to be interested; by purchasing the *Proceedings* they will be getting more than value for their money. Mr. H. J. Turner, 13, Drakefell Road, Hatcham, S.E., would be glad to hear from naturalists, not yet members.

At the meeting of the Entomological Society of London, June 27th, Mr. J. J. Walker exhibited on behalf of Mr. G. F. Mathew, R.N., a number of interesting Lepidoptera, chiefly from the Mediterranean region, and including amongst others the following:—Examples of *Thais polyxena*, Schiff. var. *ochracea*, Staud., having an unusually deep and rich colour, bred from larvæ found at Platæa, Greece; male and female of *Thestor ballus*, Hb., from Alexandria, taken on 23rd January, 1898, the male remarkable in being largely marked with orange on the upper side of the front wings; unusually large specimens of *Polyommatus baton*, Berg., from

Vigo, N. Spain; and a singular aberration, from Corfu, of *Melitaea didyma*, Ochs., with central band of black spots very strongly marked on both wings, the other spots being obsolete and the ground colour pale fulvous.

At the same meeting Mr. E. E. Green exhibited larvæ and pupæ of insects in air-tight glass tubes in which a little cotton wool, sprinkled with formalin, had been placed. The specimens, which had been thus preserved for nearly two years, had lost little of their original colour or brilliancy.

Mr Gahan also exhibited pupa-cases of a Longicorn beetle, *Placoderus obesus*, Gah., which were remarkable in being composed almost wholly of carbonate of lime. It was not known how the pupa-cases were fabricated, but presumably the larvæ must possess special lime-secreting glands.

The advisability of reprinting a paper immediately after its publication, in the same language in which it is written, must always be an open question, we venture, however, to suggest that not one of the many reasons for so doing will approach that given by our contemporary, *The Entomologist*, for reprinting the paper on "Nomenclature" that has so recently appeared in the *Proceedings of the Fourth International Congress of Zoology*. There we read: "There is no doubt that these enquiries . . . with the replies thereto will have a world-wide circulation through the medium in which they appear. It has occurred to us, however, that the area of publication might be extended by reprinting in this Journal the opinions of some of the entomologists consulted." As these have already "a world-wide circulation," one would be interested to learn the districts outside the world to which the *Entomologist* is forwarded.

In vol. viii., pp. 51-54, we summarised an excellent paper on the Mallophaga by Professor V. L. Kellogg. We have now to notice the publication of another volume of 224 pages, excellently illustrated, by the same author, entitled "New Mallophaga." To this is added an appendix, entitled, "The Anatomy of the New Mallophaga," by R. E. Snodgrass. It is a work that all students of the Order should make a point of seeing.

We have to congratulate Mr. Luff on the addition of another to his previous lists of the insects of Guernsey. This is entitled "A list of the Micro-Lepidoptera of Guernsey," and brings up the total number of insects (of all orders) recorded for Guernsey to 1,752 species. The work that Mr. Luff has been able to do in the island is little short of marvellous, and it is probable that the insect fauna of no English county is so well-known as that of Guernsey. It is needless to say that the list is quite up to the level of its predecessors.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

EGGS OF LEPIDOPTERA.—The following eggs were described when holiday-making, using a two-thirds, as a hand, lens, and must be taken for what they are worth:

Melitaea didyma.—Of a green colour with a slight yellowish tinge, especially at base. Shell smooth and shining, with about 16 faint longitudinal ribs passing from base to apex, where they meet to form

a minute elevated rim, within which is the micropyle.* The egg forms a somewhat truncated cone, but with convex top, and rounded basal edge, the basal diameter being considerably greater than the apical. The basal area appears to be quite smooth. [Described August 2nd, from egg laid in collecting box, by a ♀ captured at Bourg St. Maurice.] On August 11th five eggs were laid by a ♀ captured at Pré St. Didier. The yellowish-green tint very noticeable, and there are faint traces of transverse striations between and over the longitudinal ribs.

Limnitis camilla.—Some eggs accidentally squeezed from the body of a ♀, captured at Pré St. Didier on August 10th, were almost spherical, green in colour, covered with coarse polygonal ribbing, with conspicuous bristly hairs, arising from each angular point.

Crambus saxonellus.—Eggs laid loosely, very pale straw-yellow; variable in shape, some forming a somewhat oblong-oval, others more pointed towards the apex; most delicately, but conspicuously, ribbed longitudinally, seven ribs to be counted on the upper surface, the transverse ribs very fine and indistinct. [Described August 2nd, 1898, from eggs laid by a female captured at Bourg St. Maurice the same day.]

Acidalia mutata.—Pale greenish-straw colour, oval in outline, laid on end with the micropylar (upper) end larger than its nadir. The egg is finely ribbed longitudinally, changes to orange and then to pearly-grey, mottled with reddish or crimson blotches. The micropylar area much depressed and very conspicuously pitted. The longitudinal ribs, of which there appear to be about 16, pass over the ridge at the summit into the micropylar basin by means of a series of sharp curves. [Described August 14th, 1898, from eggs laid by a female captured at Pré St. Didier, on the same day.]

Eubolia ? vicinaria.—Eggs laid August 2nd; very minute, almost spherical; shell exceedingly shiny, pearly-white in colour, upper surface as if transparent; no trace of depression; laid loosely; apparently quite smooth with no surface markings. By August 7th the eggs had become of a pale orange colour, the shell shiny; a circular area of a rather darker orange tint than the rest of the egg, evidently the head of the embryo; a sharply defined, somewhat linear depression, distinctly visible on one side. No surface markings are visible. [Described from eggs laid by a female captured at Bourg St. Maurice, August 2nd, 1898.]

Erebia euryale.—Of a pale greenish colour, turning somewhat pearly-yellowish directly after being laid; somewhat oval in outline, but with the two poles considerably flattened. Seen from above the egg looks circular, and there are 17 well-developed, somewhat sharply-ridged, longitudinal ribs, passing from base to apex. These ribs all appear to pass over the shoulder, thinning off and forming a rim around the micropylar area, the micropyle itself forming a well-developed stella. Viewed laterally the egg appears to be of what is colloquially known as "the gooseberry" form, being broader and rounder at the base than at the apex. The surface of the shell is shiny. Egg extruded in collecting box by a female captured on the pass of the Petit St. Bernard, above La Thuile, on August 4th, 1898. By August 7th, three females captured at La Thuile, on August 4th, and enclosed in chip boxes, had deposited some 30 ova altogether. These were firmly attached to the inside of the boxes.—J. W. TUTT.

PRACTICAL HINTS.

Field Work for August.

By J. W. TUTT, F.E.S.

1.—In August the tops of the willow shoots are often tied into a close bunch by the larva of *Halias chlorana*.

2.—In late August and early September the imagines of *Cirrhoedia ærampelina* are to be obtained from 3-5 p.m., on and around the ash-trees, usually resting on the grass or among dead leaves, when careful searching is necessary (Jäger).

3.—In August cut down plants of *Typha latifolia* with a yellow central shoot, for pupæ of *Nonagria arundinis* (*typhæ*).

4.—In August cut down the tall thistles that show drooping flower heads. You will obtain the pupæ of *Gortyna ochracea* (*flavago*). They are also to be found in burdock stems.

5.—In late August and early September the females of *Stilbia anomala* sit on the flowers of ragwort in the early evening (Jäger).

6.—Sugaring the flowers of *Eupatorium* in August is sometimes a splendid attraction both for Noctuids and Geometrids.

7.—I find searching the ragwort shortly after dusk, say from 9-10.30 p.m., more productive than any other method for capturing Noctuids at Howth, in August (Hart).

8.—In August, after dark, the palings and fences around pasture lands and meadows should be searched for the imagines of *Luperina testacea*.

9.—The larva of *Pterostoma palpina* feeds on poplar and willow in August and September, and when full-fed forms a rather large silken cocoon at the foot of the tree.

10.—The low plants growing along the sides of marshy ditches should be carefully searched during August and September for larvæ of *Spilosoma urticae*.

11.—The larvæ of *Choerocampa porcellus* are to be found feeding on *Galium verum* or *G. mollugo* in August and September. Often to be found most readily by night.

12.—The larvæ of *Hadena pisi* are frequently abundant in August and September on broom, bracken, willow, &c., and although they are to be found somewhat freely in the daytime, they may be found much more commonly after dark.

13.—The imagines of *Gnophos obscurata* fly freely at dusk. After dark they settle again, and may then sometimes be taken in large numbers with a lantern.

14.—Search carefully any suitable rocks, walls, &c. (especially near the sea) for the imagines of *Acidalia promutata*. This species is on the wing from June to September (most abundant in August and September).

15.—The larva of *Geometra smaragdaria* should be searched for on *Artemisia maritima* on the marshes at the mouth of the Thames, in August and September (and after hibernation in May). It covers itself with small pieces of its food-plant, and is difficult to detect without experience. The larva can be hibernated on common southernwood.

16.—The imagines of *Paedisca semifuscana* fly at dusk among willows in August and September. The larvæ are to be obtained in May feeding on terminal shoots of willow.

17.—The imagines of *Paedisca sordidana* are to be obtained in August and September in damp places among alder and *Myrica gale*. The larva is reputed to feed on both these plants in the early part of the summer.

18.—The imagines of *Acentropus nireus* sit on the slimy masses that collect on the surface of stagnant pools in August, and fly over the surface late at night.

19.—Twisted leaves of *Viburnum lantana* and *V. opulus* should be collected at the end of August for larvæ of *Peronea tristana*.

20.—The larvæ of *Eupithecia coronata* feed on the flowers of *Clematis vitalba* and ragwort in August.

21.—The buds of *Clematis vitalba*, with a little hole in them, should be collected in August for larvæ of *Eupithecia isogrammata*.

22.—In August the cones of *Gracilaria phasianipennella* should be collected on *Polygonum hydropiper*; they produce imagines in September.

23.—In August and September the larvæ of *Homocidus binaevella* may be found in the flower- and seed-heads of *Carduus lanceolatus*, forming a large cavity at the base of the flower-head, and feeding on the young seeds.

24.—During August (sometimes as late as September) the seed-heads of *Picris hieracioides* should be collected for larvæ of *Eupoecilia hybridellana* (Barrett).

25.—During August and September, the seedheads of *Artemisia absinthium* should be collected and tied up in a linen bag. In this way the larva of *Tinea ferruginella* was discovered clearing out the seeds from the dried flower heads (Bignell).

26.—In August and September the plants of *Teucrium scorodonia* should be well shaken (or beaten) for the larvæ of *Ebulea verbascalis*. They should be given sand in which to pupate.

N.B.—For series of similar hints for August see vol. i., pp. 117, 164; vol. viii., pp. 116-118, 145-146; vol. ix., pp. 180-181, 208-209; vol. x., pp. 179-180, 197-199, &c.

NOTES ON COLLECTING, Etc.

ABUNDANCE OF LARVÆ OF *HYPONOMEUTA PADELLA*.—On Wednesday last, on a whitethorn hedge adjoining the High Road, not far from here, and close to Andreas Church, I observed a great abundance of the larvæ of this species. For a distance of over 50 yards the hedge referred to presents quite a burnt-up appearance, being entirely divested of all leaves by what might very rightly be called a "plague" of these caterpillars. They are simply in hundreds of thousands, and are feeding gregariously, surrounded by webs. I think the matter is worth recording, as I never saw anything like it before.—H. SHORTRIDGE CLARKE, F.E.S., Sulby Parsonage, Lezayre, Isle of Man. *June 27th*, 1899.

CAPTURE OF *CHRYSOCLISTA BIMACULELLA*.—It may interest the readers of the *Entomologist's Record* to know that I had the good fortune to take a fine example of the rare Tineid, *Chrysoclista bimaculella*, in North Cornwall, on the 20th June last.—N. CHARLES ROTHSCHILD, B.A., F.Z.S., F.E.S., 148, Piccadilly, W. *July 6th*, 1899.

TIME OF PAIRING OF *SESIA TIPULIFORMIS*.—Most of the London

suburban gardens that have an old currant-bush or two in them produce *S. tipuliformis*. In a garden in this immediate neighbourhood, on July 4th, I observed a pair *in cop.* about 5 p.m. They crawled upon my coat-sleeve and entered a box without any objection. They remained paired until 10 p.m.—J. W. TUTT, Westcombe Hill, S.E.

EMERGENCE OF *PORTHESIA CHRYSORRHOEA*.—The first imagines of this species appeared in the breeding-cage to-day, July 11th, a male and female. This appears to me rather earlier than the date at which they used to emerge when I bred them 20 years or more ago; 9 others emerged on the 12th, 6 males and 3 females; 1 male only on the 13th; 5 ♂ and 7 ♀ on the 16th, when 3 larvæ of the same brood were still feeding.—*IBID.*

PORTHESIA CHRYSORRHOEA LARVÆ IN ABUNDANCE AT DEAL.—I found the larvæ of *P. chrysorrhoea* and *P. similis* in the greatest profusion at Deal on June 24th and 25th feeding on sloe and sea-buckthorn, the former being specially abundant. I also found cases (pupæ) of *Fumica crassirella* on rushes near the seashore, and larvæ of what is, apparently *Luffia lapidella* on the fences, the latter feeding on the lichens thereon. Noctuids abounded at sugar—*Neuria reticulata*, &c.—E. M. DADD, 3, Colina Villas, Green Lanes, Hornsey. June 29th, 1899.

REARING *LUFFIA LAPIDELLA*.—I am sending you living females and eggs of *Luffia lapidella*, as well as some males which I have recently bred. The latter commenced emerging on June 2nd, but I had noticed two or three freshly empty pupa-cases on the walls a few days before that date. The females come right out of the larva-cases and cling to them. I noticed several thrusting their long ovipositors into the old larval-cases and, on breaking these open, I found eggs inside. I also noticed the cases on an old wall in the island of Alderney a few days since. It also occurs in Sark.—W. A. LUFF, Mount Pleasant, Burnt Lane, Guernsey. July 6th, 1899.

SPRING COLLECTING AT SKIPWITH.—The shallows were completely ruined here by the bad weather, and only one late flowering bush yielded any moths: this, however, gave me half-a-dozen *Taeniocampa opima*. Everything otherwise is exceedingly backward and larvæ small, those of *Lycophotia strigula* are in great abundance, a large number having been swept whilst working for *Agrotis agathina*. The latter also seems to be very abundant, whilst the larvæ of *Scodionia belgiaria* has been comparatively scarce—at any rate, I have swept very few. Several larvæ of *Trochilium crabroniforme* were found in some sticks brought as "pea rods," but a visit to the plantation yielded but few more. Indoors, in a room without a fire, moths still emerge very erratically. *Hadena contigua*, which began to come out in December, are still emerging singly at the rate of one or two a week. *Collis sparsata* began to come out in April, then stopped, and are just beginning to appear again, but I have many cripples of this species. Just now hibernated specimens of *Prona mictana* are plentiful on the common, but all are worn.—(Rev.) C. D. ASH, B.A., Skipwith Vicarage, Selby. May 11th, 1899.

NEW FOREST IN JUNE.—I have just returned from a visit to the New Forest, where everything appears to be scarce, and beating very slow work. I managed, however, to get larvæ of the following species: *Zephyrus quercus* fairly common; *Drymonia chaonia*, a few; *Catocala promissa*, *C. sponsa*, *Hylophila quercana*, *Nola strigula*, *Ennomos erosaria*,

Notodonta trepida, just hatched; *Lymantria monacha*, plentiful; *Amphidasys strataria*, *Asphalia videns*, a nice lot; *Eupithecia abbreviata* and *E. irriguata*. Larvæ of *Lasiocampa trifolii* were fairly common on the heath, while sweeping produced larvæ of *Agrotis agathina* plentifully and fullfed, *Noctua neglecta*, *Selidosema plumaria*, *Pachycaemia hippocastanaria*, *Anarta myrtili*, and *Eupithecia nanata*. We only had a dew on one evening, and then we stayed out till one o'clock, and obtained some 60 larvæ of *A. agathina* and 20 *N. neglecta*. Dusking was good on the whole, though we got no rarities; amongst others, we took *Scodiona belgiaria* on the heath, *Macaria alternata*, *Eupisteria heparata*, *Lithosia mesomella*, *Epione advenaria*, *Hypsipetes impluviata*, *Melanthia ocellata*, and *Hadena contigua*. Searching trunks produced *Stauropus fagi*, *Macaria liturata*, *Bourmia consortaria*, *Tephrosia exterisaria*, *Tephrosia crepuscularia* (*biundularia*), *Apatela aceris*, &c. *Macroglossa bombyliiformis* was going over, but *Acosmetia caliginosa* was not properly out, although we knocked out a few *Cochlidion avellana* (*testudo*) when beating. We had one day after *Eulepia cribrum*, and obtained about 60 in very good condition, some very much darker than others. Larvæ of *Taeniocampa gracilis* var. *rufa* were common on bog-myrtle, and we found some on dwarf sallow a long distance away, evidently laid by a wandering female, as I had never found them on it before, although they will eat it freely in captivity.—H. M. EDELSTEN, F.E.S., Forty-hill, Enfield.

THE NEW FOREST IN SPRING.—Visiting the New Forest in the spring showed that everything was very backward. On May 10th the oaks were only just beginning to leaf, and *Cyaniris argiolus*, *Drepana falcula*, *D. unguicula*, hibernated *Eugonia polychloros*, and *Gonepteryx rhamni* were the imagines seen most frequently. Dusking produced *Larentia pectinaria*, *Lygia adustata*, and *Cidaria suffumata*. On my return to Boscombe I took *Drymonia chaonia* in the garden, whilst on the heather in the neighbourhood I have taken *Eupithecia nanata*, *Scodiona belgiaria* (the first on May 18th), *Anarta myrtili*, *Pachycaemia hippocastanaria*, *Ematurga atomaria*, *Tephrosia crepuscularia* (*biundularia*) in larch wood, and *Smerinthus tiliae*, whilst *Cyaniris argiolus* appeared in Bournemouth gardens. I also found here larvæ of *Geometra papilionaria* and *Arctia villica*, whilst sugar, to date, has produced nothing. *Smerinthus tiliae*, *S. populi*, *Cymatophora ocellaris*, *Ptilodontis palpina*, *Notodonta dictaea*, &c., have appeared from my dug pupæ which I have kept in a warm room.—(Major) R. B. ROBERTSON, Forest View, Southborne-road, Boscombe, Hants. June 4th, 1899.

VARIATION.

ABERRATIONS OF LASIOCAMPIDS.—I have a male *Lasiocampa quercus* which I captured at Wicken, with the yellow band of the hindwings continued outwards to the hind-margin, whilst another has no yellow band at all, the position of the band being merely indicated by a lighter clouding across the dark brown hindwing, this example was bred from a larva taken in the west of Scotland. An example of *Macrothylacia rubi* obtained from the New Forest has the outer of the transverse bands of the forewing absent, the inner being much reduced at both ends.—W. M. CHRISTY, M.A., F.E.S., Watergate, Emsworth, Hants. May 15th, 1899.





G. Neighbour. G. B. Dixon. T. Powell. F. B. Jones. C. B. Headly. F. Bligh Bond.
 W. J. Kaye. J. W. Tutt. F. R. Rowley. W. A. Vice. F. B. Wilmer.
 J. E. Tyers. W. J. Hall. A. Gelson. T. Hudson Beare. F. Bouskell. H. Russell. J. Dodd.
 J. Goddard. J. Orgill. H. St. J. Donisthorpe. G. B. Chalcraft. Montague Gunning.
 A. Choleston. M. Burr. A. M. Corah. R. Overton.
 W. Pearson.

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SEPTEMBER 15TH, 1899.

The Annual Dinner of the Entomological Section of the Leicester Literary and Philosophical Society (*With plate*).

The generosity of Mr. F. Bouskell has enabled us to give our readers a plate, reproduced from a photograph, of the members and friends present at the last dinner of the Entomological section of the Leicester Literary and Philosophical Society, January 4th, 1899. A flash-light photograph taken at night evidently does not tend to give the best idea of the appearance of one's friends and correspondents, although it must be confessed that, on the whole, the reproduction has attained a fair measure of success.

Some of the members will be more or less well known to our readers. The Chairman is Mr. F. R. Rowley, F.R.M.S., the assistant curator of the Corporation Museum, and the ex-president of the section. His excellent biological and microscopical work, as well as his wide knowledge of entomological subjects, have made him known to a large circle of naturalists, whilst the share that he has taken in the museum work has made it one of the most successful institutions of its kind in the country. On his left is Mr. A. Colson, the able president of the Leicester Literary and Philosophical Society, whilst next him comes Professor T. Hudson Beare, who has attained much distinction in the science of mechanical engineering (of which branch he is secretary to the British Association), a charming speaker and lecturer, but who will be better known to our readers as an ardent coleopterist and all-round naturalist. Still to the left comes Mr. F. Bouskell, the secretary of the entomological section. What the entomological section would have been without its secretary we can only surmise! His unbounded energy and industry are contagious, and he keeps his members in hand in a way that is rare among even successful secretaries. He manages also to do a fair share of work among the coleoptera in spite of the occupied condition of his time. To the right of the chairman is Mr. J. W. Tutt, whilst to his right again is Mr. W. J. Kaye, of West Indian renown, who is as keenly interested in exotic as in British lepidoptera.

Standing at the back of the long table are several well-known naturalists: Mr. C. B. Headly, a member of the museum staff, an enthusiastic coleopterist and a first-class photographer, whilst next him comes probably one of the best general naturalists and physiologists that it has ever been our pleasure to meet, Mr. F. B. Jones, M.R.C.V.S. A quiet, retiring, unassuming gentleman, Mr. Jones has

to be drawn for one to find out the marvellous depths of his knowledge. As a microscopist it would be hard to find his equal, and as to his general knowledge of bacteriology, especially that branch relating to the diseases of domestic animals, he stands unrivalled. One can only express regret that so little of his original work has been published, and that his work, like that of so many of our best men, must die with him, unless he changes his mind very considerably. On the right of Mr. Jones is Mr. Dixon, the present genial president, an ardent lepidopterist and hymenopterist, who publishes much less than he ought. Towards the front of the photograph are Mr. Hall, of the museum staff, Mr. W. Pearson, whose recent attention to lepidoptera has led to the renewal of an old college friendship of more than twenty years ago (how the years do pass!), whilst Mr. H. Donisthorpe and Mr. Burr, almost as well known probably to our readers as to ourselves, and whose active and sympathetic help as sub-editors of our magazine, not only in name but in reality, has had so much to do with its recent success, need, we are sure, no introduction from us. Mr. Corah is not only an entomologist but photographer-in-chief to the entomological section, whilst Mr. Cholerton, Mr. R. Overton, and Mr. G. B. Chalcraft are all well-known naturalists, the latter being especially interested in the *Araneidae*. Dr. Dodd is a recent acquisition to the membership list of the entomological section, but his delightful speech and humorous reference to those who "labour for love" will not be readily forgotten by some of those present. Mr. Vice is a past president, one of the men who have made the entomological section, who has paid considerable attention to the Diptera, and renders generous help to those who are specially studying the group, whilst in Dr. M. Gunning, the readers of *The Entomologist's Record* will recognise one of our oldest contributors, whose genial friendship and kindly welcome is one of the things one must remember after a visit to Leicester. We do not get so many notes from his pen as formerly, because the mathematical intricacies of abstruse acoustic problems are sharing with treading the leisure of a busy man. Many other friends were present, but although there were no ladies at the dinner it must be confessed it was not the ladies' fault, for the entomological section has a strong contingent of lady members, and it was only by the most consummate tact and diplomacy that the secretary prevented the ladies taking the place by storm. However, by the time the secretary is prepared to present us with another plate, even he may be overpowered and outvoted, and we may have then to briefly review the most telling points of the lady entomologists, unless, indeed, we hand over completely such a "labour of love" to the sub-editors for treatment.

Contributions to the Fauna of Piedmont—The Butterflies of Pre St. Didier.

By J. W. TUTT, F.E.S.

When one has once seen a beautiful place, and the exigencies of circumstances have torn one therefrom, a feeling often arises as time goes on that one would like to return to the old haunts, dream, if possible, the same dreams, and enjoy to the full again the beauties one has been forced to leave all too soon. A combination of details such as these probably made me long to go back to Bourg St. Maurice, to

Pré St. Didier and Courmayeur, and as there was no serious objection in the way of my fulfilling my desires, I spent a few weeks again in these haunts in July-August, 1893. What I think of the lovely valleys on the Italian side of Mont Blanc most entomologists know, and there is no need for me to redescribe the exquisite scenery that I have already dealt with in my *Rambles in Alpine Valleys*, except as incidental phases bearing on the localities where my captures were made. That I have been able to entice some entomologists to these charming valleys, of course, I know, but none of these has given us a list of his captures, nor have I yet compiled a complete list of the lepidoptera that I have found there. In this present note I propose to deal more particularly with the butterflies to be obtained, in a few days' in early August, around Pré St. Didier and Courmayeur.

At the foot of the Italian slope of the Petit St. Bernard lies Pré St. Didier. There are two first-class hotels, and visitors need have no fear on the score of comfort, whilst the charges are fairly moderate. One can run up the valley to Courmayeur in something under an hour, or down the valley to the woods that cover the lower slopes of Mont Courmet. The collecting is delightfully easy and the scenery superb. Insects are abundant, and what more can the heart of an entomologist desire!

The year 1898 was a "fritillary" year in the valley, and I specially wanted *Dryas pandora*, or rather some of my correspondents did, and I liked the idea of catching the big fellows again, but among all the wealth of fritillaries, *D. pandora* was exceedingly scarce, and a few solitary examples proved but poor solace for the dozens seen in 1894. *Dryas paphia* abounded, an occasional ab. *valesina* was seen, *Argynnis alippe* was in hundreds, but its ab. *cleodora* scarcely observed, *A. aglaja* and *A. niobe* were abundant on the rough slopes that rise from the Dora to Courmayeur, and, as usual here, the silver-spotted type of the latter species was more abundant than the ab. *eris*, a condition of affairs rarely observed; *A. lathonia* was also abundant. The Brenthids, of course, were over, except *Brenthis pales* high up the mountains, and *B. ino* very worn (in better condition up the Val Ferrex), where *B. amathusia* was still to be met with; *B. dia* was not so abundant as one might have expected, but the second brood was only just coming out, very fairly-sized specimens, as large as the spring brood at Digne, and not like the pigmies of St. Michel de Maurienne. The Argynnid, however, of Pré St. Didier, was *Argynnis daphne*, which for two or three days abounded on the thistle blossoms, although already past the first blush in condition, and a heavy storm about August 9th cleared off the species almost completely (as it did also *Erebia ligea*) scarcely an example being seen later. A beautiful aberration of *A. daphne* fell to my net. The 2nd, 3rd and 4th costal streaks, counting from the base of the forewings, unite into one black blotch, the median wavy transverse line banded externally with black, so as to include the row of black spots normally between this and the outer margin, the margin and submarginal black spots united into a transverse series of marginal blotches; the hindwings with a central black cloud, absorbing the normal wavy line and transverse row of spots; the margin with a series of six long wedge-shaped streaks (the bases placed externally) absorbing the marginal and outer series of dots. The underside is equally remarkable—a wide central black transverse band on the fore-

wings, broken only by the nervures and discoidal lunule of the ground-colour; the hindwings without any of the darker markings, the inner area uniform yellow, the outer reddish-purple. This magnificent form one might call ab. *conjuncta*, n. ab. Kane says *daphne* "flies low, like the *Melitæas*;" on the contrary, my experience is that it flies much like *A. adippe*. High up the mountains *Melitæa aurinia* var. *merope* was still on the wing, whilst near the summits of the Grammont and Mont de la Saxe *M. cynthia* and *M. asterie* were to be taken. The abundant *Melitæid*, however, was *M. didyma*—it met one everywhere—there were females of every possible description, some fulvous-red and approaching the male in colour, others of a paler, yellowish, ground-colour, with distinct black spots, others of a dull fulvous, with the spots more or less blending with the ground-colour, others with the ground-colour pale in the four costal spaces, but the remainder of the surface green-grey, and the black markings very pronounced = ab. *alpina*, Staud. Strange to say I did not see *M. cinxia*, but *M. phoebe* gave me a few beautiful examples, some of which might be perhaps referred to Staudinger's more variegated ab. *occitanica*. I do not know whether we have a lepidopterist in Britain who is comfortably at home when considering *M. athalia*, *M. dictynna*, *M. parthenie* and relatives. One might fairly divide the specimens obtained here into the larger, coarser *M. athalia* and the smaller, neater-looking *M. parthenie*. One suspects, however, that they have all hatched from the same batches of eggs, and one observes also that the dark *M. dictynna* occurs with some very ordinary-looking *M. athalia*, in the Val Ferrex. *Papilio podalirius*, *P. machaon* and *Gonepteryx rhamni* were all somewhat rare at the time of year I was collecting in the neighbourhood, whilst *Parnassius apollo* was very abundant. *P. delius*, however, which I found at La Thuile does not appear to reach so far down as Pré St. Didier. *Aporia crataegi* is common. *Pieris brassicae*, *P. rapae*, abundant—the cabbage-plants were perfectly skeletonised in the gardens around Courmayeur—and *P. napi* ab. *napiææ* was not abundant, although the few examples seen were fond of joining the blues at the waterfalls that break over the road down by the Dora banks. *Pieris callidice* only occurred high on the mountains, and then not abundantly, whilst *P. daplidice* was not uncommon by the roadsides just below Pré St. Didier. *Leucophasia sinapis* was fairly common, and ab. *erysimi* in fair proportion. *Colias palaeno*, not common, *C. phicomone* in great abundance, high on the mountains, all round, but rarely descending lower than Courmayeur, and only once seen near Pré St. Didier. *Colias hyale* not uncommon, but *C. elusa* quite rare, unless the autumn brood had only just commenced to emerge. I captured a very fine *C. hyale* with my fingers in the road between Courmayeur and Pré St. Didier, so absorbed was it in sucking up the moisture from a puddle left by the water-cart. *Gonepteryx rhamni* is not common until one gets lower down the valley. Now and then one finds a spot haunted by *Thecla spini*, generally a mass of *Sedum* in blossom proves a most attractive bait. *Chrysophanus virgaureæ*, as might be expected, abounds, the ♀ being of the *zermattensis* form, of a yellow-brown ground colour rather than copper, and the transverse row of black spots much elongated, the hind-wings also much suffused. *C. hippothoe* (*chryseis*) only seems to occur above Courmayeur and not at Pré St. Didier, but I found a locality for *C. gordius*, from which, however, I only obtained

two or three specimens worth setting. This magnificent insect occurs all round here (where I have never seen *C. alciphron*)—at Courmayeur, Cogne, &c.—but appears to be distinctly rare and very localised. Typical *C. dorilis* occurs in the greatest abundance between Pré St. Didier and Aosta, whilst *C. subalpina*, Speyer, is only obtainable in the Val Ferrex, above Courmayeur. Here I am inclined to kick against the text-books again. *C. subalpina* is larger than typical *C. dorilis* (as large as the spring brood of the latter from Digne, if indeed this be not a quite distinct species); it is in many ways nearer *C. hippothoe* ♀ than *C. dorilis*, and is, in my opinion, a quite distinct species. *C. phlaeas* of course occurs, but it appears to be very rare. Of the Lyncenids many species occur—*Plebeius aegon*, a very small race, above Courmayeur, both in the Val Ferrex and towards the Val Veni; *P. argus* abounds in the open wood just below Pré St. Didier, and a very large form, as large as big *Polyommatus icarus*, about five miles nearer Aosta, by the roadside; *P. optilete*, abundant at the water on the mountains; *P. orion*, as usual with me, a single example; *P. pheretes*, high up on the mountains, and then rare; *P. orbitulus*, near the Glacier de la Miage; *P. astrarche* ab. *allous*, generally distributed; *P. eros*, near the Glacier de la Miage; *P. icarus* and ab. *icarinus*, common, less so perhaps than *L. escheri*, the latter of which, with *P. astrarche*, *P. icarus*, *P. corydon*, *P. argus* and *P. damon*, swills at the runnels and bathes in the hot damp sand by the edge of the Dora. *P. bellargus* appears rare, an odd example or two only, but *P. hylas* is abundant, much less so, however, than either *P. corydon* or *P. damon*. Kane notes the ♀ of the latter as rarer than the male. The species can be taken in thousands on the edge of the pinewood on Mont Courmet, just behind Courmayeur, in both sexes. *P. meleager*, I presume, is not uncommon in suitable places between Pré St. Didier and Aosta, but what I caught were badly worn. *P. donzelii* and *P. eumedon* both occur on the moraine of the Glacier de la Miage, whilst *Cyaniris argiolus* and *Nomades semiargus* are not common in the Val Veni and Val Ferrex. In the former, too, on the flat joining the Val Veni with the Allée Blanche, *P. argus* is in countless numbers. *Lycaena arion* ab. *obscura*, at present, has been seen only on the Mont de la Saxe, but I have observed none of the other large blues in the neighbourhood. *Limnitis camilla* is not common, but the autumnal examples are very large and present a great contrast to those from Susa. One or two *Polygonia e-album* fell to the net—the species is not uncommon at Aosta; whilst a newly emerged *Eugonia polychloros* was netted off an ash-tree at Courmayeur. *Aglais urticae* and *Pyrameis cardui* go up to about 6,000ft. or 7,000ft.; one finds larvæ as high as the nettles and thistles grow. *P. atalanta* and *Ganessa io* prefer the lower levels, and haunt the thistles with the fritillaries. *Melanargia galatea* gave some very fine females, whilst among the Erebias one is disappointed. *Erebia ligea* found in Pré St. Didier, gives place to rather small *E. euryale*, in the Val Veni and Val Ferrex. *Melampias epiphron* only on the higher mountains, but *M. melampus* on the grassy slopes of the Val Ferrex; whilst at the highest points *Erebia mnestora* and *E. gorge* are to be found. *E. lappona*, too, occurs at the greatest heights, but *E. tyndarus* comes down to the Dora where the bridge crosses the river above Courmayeur. On this ground, too, *E. goante* is exceedingly abundant. The *E. tyndarus* in the Val Ferrex are much larger than those on Mont de la

Saxe, about 1.000ft. above. *Satyrus cordula* is rather common around Pré St. Didier, and also between the latter place and Courmayeur, and some of the ♀s were in fine condition. *Hipparchia semele* appears to be rare; *Pararge maera* is common, *P. hiera* and *P. megera* also towards Aosta. *Epinephele lycaon* is more abundant, especially at Courmayeur, than *E. ianira*, which is not scarce. *Coenonympha pamphilus* appears to be rare, and *C. arcania* var. *darwiniana* very local. *Spilothyrus alceae*, of a warm brown tint, and *S. althaeae* of greener shade (the latter with a very white basal spot, and two others in line with this, nearer the inner margin, and one towards the base) were taken almost on the same ground below Pré St. Didier, the former also between Pré St. Didier and Courmayeur, where it bathed in the damp sand with the blues. Very fine *S. laratorae* were here and there, flying in excellent form, both above Courmayeur and all the way down to Aosta, whilst *Symphictus alceus*, with ab. *serratular* and ab. *carlinae*, having small spots and brown ground colour, were common. *S. caudiae* was rare, and *S. leo* common. Is *S. caudiae* the mountain form of *S. carthami*? One does not appear to meet with the second brood of *Nisoniades tages* till one is well down towards Aosta, but *Thymelicus lineola* reaches right up the valley to the Glacier de la Miage, and almost to the upper chalets on the Mont de la Saxe, and with it *Pamphila comma*. *T. thaumas* I did not see, and one *P. sylvanus*, very worn, suggested that the first brood was over, and that there was not likely to be a second one.

The Theory of Emboitement.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

This theory of Swammerdam's seems, as enunciated by Swammerdam, to be a prevision of our present knowledge of the development of the imago of holometabolic insects. I write to utter a word in deprecation of the contempt that is thrown on it by some modern writers. The theory is to the effect that the butterfly exists in the caterpillar. Swammerdam shows that at the end of larval life, the butterfly, *i.e.*, its wings, antennæ, legs, &c., can be demonstrated by proper management and dissection. He says that the demonstration is easier at this period, but that if his means of observation were more perfect, it could probably be done at earlier periods of larval life.

Now Swammerdam was a most excellent observer and a man of great genius as a naturalist. Yet those who make game of his theory represent him (and Réaumur, who followed him) as fool enough to believe that the butterfly he demonstrated was as perfect as the ordinary imago, and that the one that might be demonstrated in the younger larva was equally perfect and advanced. He clearly thought it was not so perfectly formed, or he would not have postulated more effective means of research to demonstrate it.

The more powerful instruments and means of research that we now possess have really demonstrated the actual truth of Swammerdam's theory. The butterfly does exist in the young larva, and in many respects as a something apart from the larva. All the parts of the butterfly that do not already exist as larval parts are nevertheless there, as embryonal cells, each group for each part or organ in its

proper relative place; and it is, as Swammerdam says, purely a question of apparatus and skill, as to how much development these embryonal cells (imaginal discs) must undergo before we are able to detect them. As development proceeds they assume more and more of their imaginal condition. When no longer required the larval organs or parts of them, are stripped off, by histolysis as well as by ecdysis.

In the earlier days, when Weismann's researches were first given us, many people supposed that histolysis took place first and development afterwards, that the larva was reduced to a state similar to a segmented ovum, and that thereout the imago was developed something like the embryo in the egg. We now clearly understand that this idea was much greater nonsense than Swammerdam's theory. The emboitement theory does indeed represent our present knowledge as accurately as the resources and ideas available at the time could do so.

The imago is there, from the first, so soon as the larva is fully formed. Many of its parts are represented by only a few cells, and are overlaid (emboxed) by many larval parts of only temporary use, to be afterwards stripped off when they have served their purpose.

Swammerdam knew nothing, as such, of imaginal discs or embryonic cells, but he divined that, in the small larva, there existed the imaginal wing, the imaginal antennæ, and the imaginal legs. He, of course, knew they must be very small and were not occupying space that he saw was occupied by larval structures. He foresaw, in fact, all our present knowledge, wanting only that detail and elaborated terminology that only actual observation can supply.

He was, in this, as in some other matters, a genius and a poet, and not the blundering idiot that he is implicitly represented to be by those who deny and deride his theory.

Migration and Dispersal of Insects: Odonata.

By J. W. TUTT, F.E.S.

The great number of times that *Libellula quadrimaculata* has been observed on migration compared with any other species is very remarkable, and Hagen says that this species is the one which he had himself repeatedly observed. The migration already referred to as having taken place in 1852*, was traced by Hagen from its origin to its termination. He states that in June, 1852, on a fine warm day, he noticed about 9 a.m., over the Königsthor, an immense swarm of *L. quadrimaculata*, flying into the town. At midday they were still advancing in thick masses, and Hagen then went out of the town to watch the flight where there was a free space, and notes that for a quarter of a mile towards Dewan, the flight was at about 30ft. above the ground, whilst nearer Dewan it was lower, judged by the height of the trees, whilst still nearer it was so low that, seated on a waggon, Hagen was driven through it. Further information was afterwards obtained, which tended to show that it originated near Dewan, whilst the following day the flight was noticed at Karschan. The flight was towards the east. He considered it to be an instinctive migration,

*This was *Libellula quadrimaculata* and not *Platetrum depressum* as mentioned ante p. 154.

that the dragonflies were not driven to swarm for want of food and that, therefore, the flight was different from the swarms sometimes observed flying over the water, especially if there has been a cold spring to retard their development.

The British species of dragonflies may be roughly divided into four groups: (1) Undoubted sedentary species. (2) Known migrants. (3) Suspected migrants. (4) Casuals or suspects. In the second group *Platetrum depressum*, *Libellula quadrimaculata*, *Æschna mixta*, and *Æ. grandis* have already been dealt with. The suspected migrants are species of exceedingly erratic appearance, and include *Sympetrum fonscolombii*, *S. flavicolum*, and *S. sanguineum*. *S. fonscolombii* is a widely distributed species, extending its range to South Africa, and was for many years known as British from single specimens in the collections of Stephens and McLachlan. Hall then captured it at Deal, and Briggs took 17, all males, between July 8th-17th, 1892, on Ockham Common, near Wisley, Surrey; Briggs considers these to have been part of an immigrant swarm, which, from the early date of their appearance, probably came from North Africa. *S. flavicolum* was observed by Müller in large numbers on August 27th, 1871, on Shirley Heath, ovipositing in and flying around a pond there, whilst Lucas, in September, 1898, found this species, rather worn, but in fair numbers, on Ockham Common, and single specimens were also sent for identification from Elstead in Surrey, Oxford, and Colchester. These evidently appear to have been immigrants, and Lucas suggests that they possibly came from Belgium, whilst the same species has been recorded by Doubleday as very common in certain years among the gravel pits in Coopersale Common, near Epping, in August and September. Lucas thinks that *S. sanguineum*, which Doubleday also records as very common among the gravel pits of Coopersale Common in September and October, is also so local and sporadic in its appearance in Britain that it is most probably a visitor to our shores. The occurrence of odd specimens in various localities in 1898 he considers supports this view. One suspects that the British captures of these three species may be either immigrants or the direct progeny of such. The "casuals" possibly owe their places on our list to much the same cause as do certain Sphingids and butterflies. McLachlan notes that *Leucorrhinia pectoralis* is reputed to have been taken on board a fishing-boat at the mouth of the Thames. Two *Sympetrum meridionale* were recorded long ago as British, but this species is not a very likely native, although it occurs abundantly in the Alps of Central Europe, sometimes ascending to great elevations where it could hardly be expected to breed. *Gomphus flavipes* (*Lindenia*) *forcipata* is in the Stephens' collection (but the example is not too well authenticated), whilst an example of *Gomphus flavipes* was captured by Stephens at Hastings on August 5th, 1818, both species being possibly only very occasional visitors in this country. *Lestes viridis* (one example), *Lestes virens* (two examples), and a single specimen of *L. barbara* in the Dublin Museum are all badly authenticated as British. These three last-named specimens, too, are insects of feeble flight, and it is quite possible that the examples of supposed British origin were never really captured in this country.

The records of dragonfly swarms here given could no doubt be greatly increased by a more careful hunt through the foreign literature relating

to the subject. The more "habitual" migrants, if, indeed, the term habitual really applies to their case, are by no means the most powerful insects, nor are they apparently provided with any special development which might furnish a clue to the explanation of their wanderings. It is, therefore, difficult to connect the wide distribution of many species with specially great physical strength and the large development of the wing-muscles and wing-nervures, for many of the most powerful, physically, of the dragonflies are exceedingly local, and there can be little doubt that this distribution is due rather to a powerful inherent migratory instinct than to mere power of wing. We have already noted that *Pantala flavescens*, Fab., one of the most widely distributed species, and a notorious wanderer, is not at all, in spite of its large size, a conspicuously strongly-built species.

The records of these migrating swarms are generally so vague and uncertain that the data are altogether insufficient to make any useful generalisations, although here and there the swarms are noted as preceding or coincident with hot and dry weather when one might suppose many of the pools in which their eggs should be laid are dried up, and where the immediate necessity of finding a suitable place for oviposition might be considered a sufficient incentive to put in motion the migratory tendency. There can be no doubt, however, that some dominating influence impels these more abundant species (in certain districts), which have proved their fitness for existence by spreading over a vast area, to travel as far as possible, and such species by their adaptation to various conditions of temperature and climate are more certain to survive in the struggle for existence going on around them.

The dragonflies are more nearly allied to the Orthoptera (locusts, grasshoppers, &c.) than are butterflies and moths, and, therefore, what has been said concerning the probable origin of the migrating instinct in that order (*vide* preceding chapter) applies very strongly to the order we are now considering. It must not be forgotten, also, that it is necessary for many species of dragonflies to seek keenly for food, and that the voracity of the species belonging to certain genera—*Eischna*, &c.—is appalling. It is not surprising, therefore, to find that migrating swarms of butterflies are frequently noticed as being accompanied by one or other of the species of dragonflies that prey upon them. In common with that of the Orthoptera, the instinct of migration probably arose in direct connection with want of food, and the present conditions of life in many species necessitates its development to a high degree of perfection.

Contribution to the life-history of *Psyche zermattensis*.

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

A Psychid case, occurring freely in the neighbourhood of Locarno in the first and second weeks of April, 1899, was obtained almost everywhere below 1,000ft. above lake level, and especially freely on the rocks and walls near the lake between Brissago and Ascona. Some of these cases were already empty, some, at least, of these belonging to the previous year, but certainly not all. Others still contained active larvæ, a few of these, perhaps, wandering in search of food, others in search of a place suitable for pupation, but most of them larvæ, simply because very recently hung up for pupation. It was the case with this

species and one or two others, and is, probably, with many, that if the case be disturbed very slightly after it is hung up, the larva again becomes active to find a fresh place, and I have noted that it continues restless for a long time, if unable to find one. It dislikes, for instance, the smooth surface if it be confined in a glass vessel, and also seems to realise and resent being in a confined space. Examples that continued restless for many days under such circumstances settled down contentedly when allowed to climb a few feet of wall.

Case.—The length of the case is $\frac{3}{4}$ in. to $\frac{1}{2}$ in., and about $\frac{1}{8}$ in. in diameter, straight, and of circular section, tapering gradually through about half its length to the free end (tail of larva, head of pupa), and very slightly to the attached end. The silk it is formed of is white, and tough against tearing, but has no solidity, so that the case is very compressible. It is covered with small scraps of rock, chiefly scales of mica, some of considerable (comparatively) size, making rather a brilliantly sparkling object in many cases. The rocks in its region are highly micaceous. The case is white or blackish (or more usually intermediate) according to the tint of the other rock constituents at its precise habitat. On April 13th two ♂ imagines were taken on the wing. Others emerged at various dates afterwards. The cases taken were much more largely males than females, and a large proportion failed to emerge, no doubt, owing to illusage in travelling, and especially as regards temperature in England. These Psychids require the cases containing the pupæ to be exposed to the sun, if one may judge from their most usual stations when hung up; but any artificial attempt to keep them warm results in drying them up, or damping them off. No doubt the spinning up to a solid surface involves an arrangement of silk both at the end of the case so closed, as well as elsewhere, that restrains evaporation within safe limits. Their removal often breaks this down and destroys this protection.

Pupa.—The *female* pupa is about $\frac{3}{16}$ in. in length, and rather over $\frac{1}{16}$ in. in thickness where widest, *viz.*, at about the 6th abdominal segment, whence it is rounded off behind, and tapers off to about half that diameter ($\frac{1}{32}$ in.) at the thorax. The mesothorax, forms the anterior end of the pupa, the head being bent ventrally. There is no definite cremastral armature, but there are ventrally longitudinally impressed lines on 8, 9 and 10. The lateral subspiracular flange is indicated by a faint line, along which the curvature is greater, looking as if the pupa had once been flattened down and this had been the line of folding not quite successfully straightened out—three lines of faint depressions both dorsal and ventral of this. The scars of prolegs are well marked. There is a dorsal ridge on pro- and mesothorax, which together form a sort of hood, beneath which the face is sunk. The face area, with that of the front of thoracic segments, forms a small wrinkled surface, in which no detail of parts can be safely defined. The movable incisions are those in front of abdominal segments 4, 5, 6 and 7; that between 2 and 3 seems to be anchylosed ventrally, but dorsally to have a structure still admitting of movement. The dorsal spines are represented by three rough transverse ridges across the dorsa of segments 8 and 9, and in some individuals just indicated on 7. The dehiscence is by a dorsal slit down the thoracic segments, the prothorax also partially separating both from the head and the mesothorax. An examination of the dehiscid pupa-case shows more definite

structure than can be at all clearly seen in the living pupa. There are distinct antennal lobes extending down each side of the head, level with their extremities and between them, are lobes that represent the maxillæ and the labium, with palpi fused at its extremity, hardly less distinct than in the ♀ *Solenobiid* pupa; basal to the labium is a narrow plate (the labrum), and just above this the clypeal margin, large pieces outside these, and basal to the maxillæ, are probably mandibles, their size being great compared with the other parts, which are here as much atrophied as the mandibles alone usually are. The legs are represented by three pairs of circular pockets, close together and immediately following the head; the prothoracic plate is ventrally almost evanescent, the other thoracic plates narrow. The wings are represented by small pockets, from edge to edge of the segment, the anterior about 0.2mm. long, the posterior about 0.1mm. The prolegs are represented by strong oval chitinous rings. The intersegmental membrane is present between the 1st and 2nd abdominal segments, but appears to be stretched permanently and not functional. Between the 2nd and 3rd abdominals is a functional intersegmental membrane, which overlaps, and so admits of movement here; certain pits above and below, and so forming the lateral flange, are very distinct. Two small hairs exist on either side dorsal to the wings on the meso- and metathorax, a line of four across dorsum, on the abdominal segments, the trapezoidal and supraspiracular hairs exist, the trapezoidal being reversed as in the larva, and very near the posterior margin of the segment. No trace of the thoracic spiracles is detected.

Ovum.—The eggs are not quite spherical, but about 0.60mm. in length and 0.52mm. in width, slightly smaller at one end, and flattened at the ends enough to give them a somewhat square look. This appearance may, however, be due in some degree to pressure. As laid in the case they are very difficult to isolate and individualise, nearly as much so as in the case of *Heterogynis penella*, and there appears to be some adhesive material binding them together. It is probably this that removes the wool from the surface of the moth by adhering to it.

Female imago.—The female moth is very like the pupa in outline and size, as well as colour, but it is distinctly paler. The head and thoracic segments, with dorsal margins of 1st abdominal, seem to be fused into a solid mass, at least dorsally, but distinguishable by separating lines. Dorsally this portion is dark, nearly black, very smooth, polished and shining. Ventrally there are dark spots representing eyes, and two small points possibly mandibles (or antennæ?), but the rest of the area is nearly smooth, with no trace of mouth-parts or legs. Ventrally there is a series of brown spots which are evidently nerve ganglia. They are obvious on abdominal segments 2, 3, 4, 5, and 6, but are hidden on 7 by the clothing of wool. This 7th segment has a good spiracle, the last, and is clothed with wool, anteriorly nearly all over, laterally for its posterior half, narrowing dorsally so as to be narrow or wanting at the dorsal line. The uncovered portion of the segment is so much telescoped into the 8th that the segment appears to be completely clothed. The 6th segment has a similar clothing of wool, but so much less in amount as to form rather, perhaps, two ventral and two slighter lateral patches; a trace also occurs on the 5th segment. This wool is wavy, closely set, and of a bluish-green colour, so that it may easily be mistaken for a growth of blue mould, perhaps

because the contrast of the colour of the wool with that of the general surface is much that of blue mould on cheese. Dorsally the general tint is a little darker, by minute purplish spotting, and there is distinct division into two subsegments on the 4th, 5th and 6th abdominal segments; 5 has, indeed, three subsegments by the further subdivision of the anterior one. These numberings of segments are quite possibly erroneous, as numbering them is extremely difficult, from whichever end of the animal one counts. There appear, however, to be three segments beyond the one called 7, which carries the dense clothing of wool. These segments are all much smaller than the preceding (7th), and the last is quite narrow, seen dorsally it is slightly forked, each projects ventrally giving a serrate profile. In a mounted specimen the brown head presents two black eye spots, and the mouth-parts are a pale area enclosed in a circle with a dark point on either side. The wings are represented by pale rounded areas, surrounded by darker pigments. Curiously there is a similar, though smaller, mark on the 1st abdominal segment. This appears to take the place of a spiracle which is not discoverable on this segment, unless it has a minute opening in centre of this spot. The nervous ganglia are a considerable mass in the thoracic region, a largish globular mass at anterior margin of 1st abdominal segment, a small one in centre of segment, another, less rounded, rather angular, at anterior margin of 2nd abdominal. In each of the 3rd, 4th and 5th, a long lozenge-shaped ganglion, giving off two cords at each end, going to the next ganglion, in the 6th a similar one, except that it has an irregular mass at its posterior extremities that, by some constrictions shows itself to be a grouping of two at least, probably three, further ganglia; none exist on 7 or further back. The 7th segment has a small T-shaped chitinous plate, but the chitinous structures of the ovipositor, 8, are too complicated for easy description. Dorsally, the same remark applies, there is a chitinous posterior margin to 7th segment dorsal, and near the anterior dorsal margins of 6 and 7 are narrow short marks, representing dorsal plates. Except the wool already referred to, and some fine bristles on the ovipositor, no hairs can be detected.

Pairing.—On May 2nd a ♂ moth was found emerged at 7.30 a.m., and in looking over some cases in another jar I found two cases that appeared to contain emerged females. The female moth comes out, or partially out, of her pupa-case, and so far out of the silken (mica) case as to protrude her head from it, and then retreats. The object of this manœuvre is to expand the tubular mouth of the silken case, which remains open, and of nearly the same diameter as the opening in the male case, by which the pupa emerges. I placed the newly emerged male with these, when he immediately became very active, and at once commenced to thrust the extremity of his abdomen into the open extremity of the first case he reached. He proceeded to gradually work into the case the whole of his abdomen until, in perhaps two minutes, it was buried right up to the thorax, so closely as to push forwards the hind wings by the margin of the case pressing against their bases. He then became quiescent, maintaining this position for about three minutes, when he somewhat rapidly released himself and flew off. Examining him whilst *in situ* in the case, I found I could see the first and second pair of legs, but I could discover no sign of the third pair, which appeared to be included with the abdomen in the

case of the female moth. Though I did not see them so used, not knowing what to look for, and the whole process being so short and rapid, I have no doubt they entered the case with or before the abdomen, and were used as a means of drawing it into the case. Unfortunately I failed to observe another pairing, though one at least took place during my absence, and I may not have correctly made my observations in this solitary instance. Assuming that it is the rule for the male Psychid to introduce the third legs in this way into the case, it would afford an explanation of the loss of the tibial spurs, that are so well-developed in the earlier (Solenobiid and Fumeid) divisions of the family.

The British species belonging to the Fumeids.

By J. W. TUTT, F.E.S.

To say that the collection of the Fumeids in the general collection at the British Museum is exceedingly unsatisfactory, is to state a fact very mildly. Not more than half-a-dozen of the Palearctic species are represented, and of these the number of examples is absurdly inadequate for study, yet some of the species are obtainable on the Continent for a few pence.

The Fumeids are a most interesting little group of the superfamily PSYCHIDÆ, making their cases of silk and covering the outsides with pieces of straw, arranged longitudinally (*Fumea*), or with small pieces of bark and lichen (*Proutia*). In spite of the fact, however, that they are of fair size, and easily collected in the larval and pupal states, the imagines emerging freely, we are not at all certain as to the number of species that inhabit Britain. At any rate, we appear to have the following:—

(1) *Fumea crassiorrella* (*affinis*), the large brown species, with rather broad and somewhat square wings, examples of which have been sent to me from Glengariff (Richardson), Rainham (Burrows), Doncaster (Corbett), nr. Ealing (Montgomery), &c. This is undoubtedly the *crassiorrella* of Bruand. If two examples in the Museum collection, labelled *affinis* by Zeller, and taken at Bergün, are rightly referred, then *affinis*, Reutti = *crassiorrella*, Bruand.

(2) *Fumea casta* (*nitidella*, *intermediella*).—This is the smaller brown species, and I would ask—Does this occur at all in Britain apart from *roboricolella*? There can be no doubt that *roboricolella*, Bruand, is the intensely dark, brown-black species we get in the neighbourhood of London, &c. It is quite blackish when bred, but I suspect it loses its intensity with age and becomes brown. I firmly believe, at present, that all our examples are *casta* (i.e., *nitidella*). I am quite aware that Bruand says that *roboricolella*, ♀, has a white anal tuft; unfortunately our *roboricolella* (so far as male characters are concerned) has a female with a gray anal tuft. Mitford notes (*Ent. Mo. Mag.*, vi., p. 186) that *intermediella* and *roboricolella* interpair freely. One would like to know whether Barrett and those other entomologists who separate *intermediella* and *roboricolella* have ever really had *roboricolella* that fully satisfy Bruand's original description by having a female with a white anal tuft. If not, it appears to me, that we must sink *roboricolella* (at least British) in *casta*. I had some

nitidella (i.e., *casta*) cases sent me by Voelschow this spring; they produced our dark brown-black *roboricolella* so-called.

(3) *Punca sariolella*.—This is an almost whitish (greyish-white) species, nearly of the shape of *crassiorella*, but smaller, locally rare in southern and south-eastern France, of which I have specimens (1) from Coverdale's collection, (2) of my own breeding (unfortunately without exact data), (3) from Rainham (Burrows).

(4) A rather small, pale grey-brown male, bred by Chapman among a lot of *roboricolella* (? *casta*) obtained at Anerley. This, Griffiths says, has such a different frenulum from the other examples bred from this locality, that he suspects it will prove distinct. Certainly the ♂ specimen looks distinct enough.

It would be interesting if those lepidopterists who have any doubtful examples of this family would allow Mr. Griffiths to examine the frenulum of their specimens with a view to their correct determination.

The second section of the Fumeids is also little known. The two species referred hereto are—

(5) *Proutia betulina*, bred by Mr. Whittle this year from the South-end district. The ♀ of this species has a snowy-white anal tuft.

(6) *Proutia salicolella*, which appears to be more generally distributed than the former, if one may judge from the cases in the old collections (Stephens, &c.).

These notes are written purely in the hope of drawing attention to a little worked group. It reflects little credit on British lepidopterists that a group of moderately large moths should be so little known. A little systematic work by two or three real observers, in touch with one another, would soon set matters straight. An examination of the material now in collections, might conduce to this desirable result.

SCIENTIFIC NOTES.

ERRONEOUS APPLICATION OF THE NAMES COSMODACTYLA AND ACANTHODACTYLA.—Hubner, in the *Europ. Schmett. Alucitæ*, ix., names figs. 23-24, *acanthodactyla*. These are undoubtedly the olive-grey or olive-fuscous species we know as *cosmodactyla*. Hübner's figs. 35 and 36, named *cosmodactyla*, are just as clearly the insect we know as *acanthodactyla*. Treitschke (*Die Schmett.*, ix., 2nd part, pp. 234 and 235) transposes Hübner's species. He describes his *acanthodactyla* as "obscure-fuscous," his *cosmodactyla* as "olivaceous-fuscous." To the former he quotes Hb., figs. 23-24, to the latter, Hübner's figs. 35-36., i.e., exactly the contrary to what should have been done. It is possibly from this point that our present error in synonymy has originated. The *cosmodactyla* of Herrich-Schäffer, *Sys. Bear.*, v., fig. 4, is simply a form of the same species as his fig. 5, which he calls *acanthodactyla*. Both are Hübner's *cosmodactyla*, i.e., the species known in this country as *acanthodactyla*. The synonymy, therefore, should be—

(1) *Acanthodactyla*, Hb., "Eur. Schmett. Alucitæ," figs. 23-24 (1793) = *Cosmodactyla*, Tr., "Die Schmett.," ix., p. 235 (1833).

(2) *Cosmodactyla*, Hb., "Eur. Schmett. Alucitæ," figs. 35-36 (1793) = *Acanthodactyla*, Tr., "Die Schmett.," ix., p. 234 (1833) = *Acanthodactyla*, H.-Sch., "Sys. Bearb.," v., fig. 5 (1853) = *Cosmodactyla*, H.-Sch., "Sys. Bearb.," v., fig. 4 (1853).

This is exactly the contrary to the way the names are now generally used in Britain.—J. W. TUTT.

RESTING HABIT OF LIBYTHEA CELTIS.—The under side of this butterfly is of a green-brown tint with irregular shades of yellowish. When at rest the forewings are lowered until the costa is on a level with the costa of the hindwings, this agreement extending from the base to the curved projection on the hindwings, which extends above the costa of the forewings. The outer part of the forewings extends beyond the hindwings, and the curve below the angular points of the former fits the curve of the outer margin of the hindwings. The dark antennæ are curved forwards and lowered until the tips just reach the surface on which the insect is resting. The long palpi fill in the hollow between the antennæ and complete the resemblance that they bear to the pedicel of a leaf. The median nervure of the hindwing is dark brown, and conspicuous to the end of the discoidal cell, its branches are also rather dark. The inner margins of the wings just touch the surface on which the insect rests. The resemblance of the whole to a dead leaf is most striking and unmistakable.—J. W. TUTT.

CROSS BETWEEN CLOSTERA CURTULA AND C. PIGRA.—Large numbers of both these species were out in the same breeding-cage during the last few days (*viz.*, July 20th-25th), and I find that in three instances male *C. pigra* have paired with female *C. curtula*; the ova are brown in colour as in *C. curtula*. Can anyone inform me whether this cross will produce true *C. curtula*?—L. W. NEWMAN, Bexley. [This cross will produce hybrid *pigra* × *curtula*. In the *Insekten-Borse* for July 27th, p. 177, Dr. Standfuss notes the following hybrids in this genus: *Pigra* ♂ × *curtula* ♀, *curtula* ♂ × *pigra* ♀, *curtula* ♂ × *anachoreta* ♀, *anachoreta* ♂ × *curtula* ♀, ♂ (*pigra* × *curtula*) × ♀ (*pigra* × *curtula*), ♂ (*curtula* × *pigra*) × ♀ (*curtula* × *pigra*), ♂ (*curtula* × *anachoreta*) × ♀ *anachoreta*, ♂ (*anachoreta* × *curtula*) × ♀ *curtula*, whilst a male of the cross ♂ (*curtula* × *anachoreta*) × ♀ *anachoreta*, was afterwards paired with a ♀ *anachoreta*.—ED.]

SCENT-TUFT OF MAMESTRA BRASSICÆ.—I have lately examined a specimen of *Mamestra brassicæ* which seems to have a curious growth on the right side of the thorax. I found it flying about the house last night. The first thing I noticed was a peculiar odour, which made me look at it, and by gaslight I thought it was mildewed, but on examining it again this morning the structure appears to be something like two abnormal tufts of hair. A large tuft growing from the thorax and a small one from the upper part of the abdomen.—F. W. BIRD, Rosedale, 162, Dalling Road, Hammersmith, W. August 7th, 1899.

PRACTICAL HINTS.

Field Work for September and October.

By J. W. TUTT, F.E.S.

1.—The isolated patches of *Galium* that grow on the shingle, in our coast districts, often harbour large numbers of the larvæ of *Macroglossa stellatarum* in September.

2.—In September the larvæ of *Cochlidion arellana* (*limacodes*) are to be obtained by beating the oaks in our southern woods.

3.—In September *Ennomos tiliaria* is often very abundant on gas-lamps. It flies at dusk, and normally rests on the trees, after dark, in woods, &c.

4.—Nests of humble-bees and wasps collected in September and October will often give large numbers of the larvæ of *Aphomia sociella*.

5.—The large beds of *Chenopodium*, which are to be found flourishing on the waste places near river banks in most districts of England, should be beaten in September and October for the larvæ of *Eupithecia subnotata*. Many larvæ fall to the ground and want searching for there.

6.—The imago of *Cidaria psittacata* is to be obtained at ivy or hiding in outhouses, in September and October.

7.—The imagines of *Chesias spartiata* are best obtained by searching the broom bushes after dusk with a lantern, in October. The larvæ may be beaten in May and June.

8.—The larva of *Pericallia syringaria* hibernates small, and may be found in September and October on honeysuckle, privet and lilac (also in May after hibernation).

9.—The larvæ of *Agrotis ripae* are to be found by day just below the sand where *Salsola kali* grows, in September and October.

10.—In September the larvæ of *Eupithecia trisignata* are often very abundant, feeding on the flowers of *Pastinaca sativa*.

11.—In early September *Oenonis* should be swept after dark for larvæ of *Heliothis marginata*. Easily obtained by beating or shaking by day.

12.—Sleeve larvæ of *Apatura iris* out on willow, so that they can get on a thick branch; they must be removed from the sleeves every day till they settle down on a twig, as none ever hibernate successfully if left on the sleeve (Hewett).

13.—In September the willow and poplar leaves are fastened to the stem, or the terminal leaves are spun together, by the larvæ of *Peronea hastiana*.

14.—The full-fed larvæ of *Acrolepia autumnitella* are to be obtained in September, in mines that make conspicuous greenish-white blotches in the leaves of *Solanum dulcamara*.

15.—In September and October the larvæ of *Elachista turniatella* may be found in the leaves of *Brachypodium sylvaticum*.

16.—The larva of *Eupoecilia curvistrigana* should be searched for in September in flowers of *Solidago virgaurea*, eating out the young seeds and passing from one flower to another. Spins up among rubbish or surface of ground. Also *E. subroseana*, *E. implicitana* and *Catoptria aculeana*.

17.—The larva of *Stigmonota weirana* should be searched for in September and October, when it feeds between united beech leaves.

18.—*Epimela lichenea* occurs in September at Portland, but does not begin to fly until about midnight (Richardson).

19.—Pupæ of *Eupithecia fraxinata* are to be found under moss on ash-trees in October. As many as fifteen were taken in 1898 in one small hollow in the trunk of a pollard ash (Robertson).

20.—The pupæ of *Poecilocampa populi* are to be found in October either under loose bark or spun up among grass and rubbish at roots of oak, elm, willows and poplar (Robertson).

21.—The pupæ of *Craniophora ligustri* are best obtained in October by searching under moss and stones on walls near ash-trees (Robertson).

22.—The pupæ of *Cymatophora ocularis* are best found in October, at or near tall poplars, under bark, moss, among rubbish, or spun

up among ivy leaves three or four feet from the ground, attached to old stumps near, in fact in any corner, but want searching for very carefully as they are easily crushed (Robertson).

23.—In late September and early October a visit to the New Forest should produce among others the following larvæ:—*Gnophria rubricollis*, *Heterogenea cruciata*, *Apatura iris*, *Demas coryli*, *Lobophora sexalata*, *Eurymene dolabraria*, *Tephrosia extersaria*, *Drepana falcula*, *Notodonta dromedarius*, *Chlorophora prasinana*, *Zonosoma trilinearia*, *Z. punctaria*, *Acrionicta leporina*, *Cleora glabraria*, *C. lichenaria*, *Lithosia helveola*, &c.

24.—The tops of moss-covered stumps of trees that have been cut down should be carefully peeled for pupæ.

25.—Pupa-digging enables a collector to employ his leisure in winter and spring in a most profitable manner. A trowel and a three-pronged fork with prongs bent backwards for pulling up turf, are useful tools for the purpose.

26.—The cocoons of *Cerura bijida* are placed irregularly, sometimes on the bark at the level of the soil, sometimes well up, usually well within the line of vision. Sometimes the larvæ go from their food-plant (poplar) to an adjacent tree to pupate (always near the food-plant).

N.B.—For series of similar "Practical Hints" for the same time of the year, see vol. i., p. 164; vol. viii., p. 194; vol. ix., pp. 240 and 284; vol. x., pp. 225-226, &c.

COLEOPTERA.

PHYTOSUS NIGRIVENTRIS ON THE WEST COAST.—I took this species plentifully in April on the Cheshire and Lancashire coasts. It was particularly common at Hoylelake, but occurs no doubt all along the sandy coasts of Cheshire and north Wales. I traced it up to within a mile or two of Southport, on the Lancashire side. It occurs almost invariably with *Phytosus balticus*, but is distinguishable from it at a glance by its larger size, especially in point of breadth of hind-body and by the coloration. The species occur in any decayed matter, vegetable or animal, sometimes under bits of wood on the road, but they seem particularly fond of the familiar bunches of eggs of *Buccinus undatum*, which should be pulled to pieces over a newspaper.—B. TOMLIN, B.A., F.E.S., Llandaff.

CIS VESTITUS, MELL. AND C. FESTIVUS, Pz.—It is almost impossible to separate these two species by the characters given in our handbooks, whether founded on the shape of the thorax or difference in the pubescence. Abeille de Perrin, in his excellent monograph of the genus (Marseilles, 1874), fully recognises this difficulty, and states that he can see no absolutely distinctive character, except that furnished by the abdomen of the male. This may be stated thus:—

First segment of abdomen of male bearing a small umbilicate depression in the middle—*vestitus*, Mell.

First segment rugose all over, but with no umbilicate depression—*festivus*, Pz.

The males of both species are easily known by the two tubercles on the clypeus.—E. A. NEWBERRY, 12, Churchill Road, Dartmouth Park, N.W. July 10th, 1899.

COLEOPTERA AT WEYMOUTH.—Easter of this year was marked by rather unfavourable weather conditions, cold, windy, wet, or foggy weather being the rule during my visit to Weymouth. I managed, however, to get some good insects, and a brief notice of the more interesting captures may be worth putting on record. On the Isle of Portland I found this year *Xantholinus tricolor*, F., fairly common, and also *Harpalus caspius*, Stev., but the best insects were *Lathrobium angustatum*, Lac., and *Actobius signaticornis*, Rey., taken in moderate numbers out of thick moss covering large stones in an almost dried-up pool. On Chesil beach, under small stones, on the sandy flat, near the bridge over the fleet (these flats are submerged at every tide), *Diglossa mersa*, Hal., was plentiful, with *Cilleus lateralis*, Sam., and a few *Bledius unicornis*, Germ. On the sandhills I took half a dozen *Harpalus picipennis*, Duft., with many other species of the genus, *Masoreus wetterhali*, Gyll., and, of course, *Anthicus tristis* v. *schaumi*, Woll., and *Bledius spectabilis*, Kr., with many other sandhill insects. The shore between Weymouth and Portland produced, under seaweed, *Lymnæum nigropiceum*, Marsh, *Trechus lapidosus*, Dawson, *Heterothops binotata*, Er., and most of the small Staphs. found so abundantly in such situations. On the grassy slopes of the cliffs, about a mile beyond The Nothe, I found *Meloe proscarabæus*, L., commonly, and picked up one specimen of the rare *M. brevicollis*, Panz. Several other visits to the spot failed to produce another specimen. Unfortunately the weather was dead against me, rainy and no sunshine. The morning I took the specimen was one of the exceptional sunny days after a night of rain. I paid two visits to Herringstone marshes, near Dorchester. On both occasions I secured specimens of *Megacronus cingulatus*, Mann, running on the pathway, the second specimen turning up within a few feet of the spot where the first was taken four or five days before. In the marsh the best things were:—*Oodes helopiodes*, F. (shaken out of a bundle of moss brought home with me), *Acanthopneuste conspurcator*, Duft., *Bembidium clarki*, Dawson, *Allochra brevipennis*, Grav., *Calodera aethiops*, Grav., *Philonthus micans*, Grav., *Lathrobium filiforme*, Grav., and *Stenus circularis*, Grav., mostly in fair numbers; a single specimen of *Megacronus analis*, F., was shaken out of moss growing on the trunk of a tree. At Abbotsbury, in haystack refuse, *Oxytelus insectatus*, Grav., *Heterothops dissimilis*, Grav., and *Microglossa suturalis*, Mann, were the only things I found before heavy rain put an end to the day's work. Haystack refuse, near Weymouth town, produced *Quedius scintillans*, Grav., and *rugipes*, Grav., commonly, with many other Staphs. A fine bright blue *Pterostichus cupreus*, L., from Portland, a very vivid green *Chlaenius nigricornis*, F., from Herringstone, are colour aberrations worth mentioning. The backwardness of vegetation and the cold wet weather practically confined collecting to the *Carabidae* and *Staphylinidae*, and it will be noted that nearly all my captures were in these two families.—T. HUDSON BEARE, B.Sc., F.E.S., King's Road, Richmond, Surrey.

QUEDIUS TRISTIS, GRAV., IN SCOTLAND.—Canon Fowler states in his *Coleoptera of the British Islands*, vol. ii., p. 237, that this insect is "rare in Scotland (Solway district)" and in a footnote on the same page he says: "It is recorded in Murray's *Catalogue* as 'common' in Scotland, but this appears to be in error." During the past few days while in Edinburgh I have found this beetle in numbers under stones

on Arthur's Seat and at North Queensferry; in about half an hour's work in the first locality I must have seen some scores, it was under almost every stone, and often two or three under one stone. As I was in want of more *Queelius fuliginosus*, Grav., I examined in many cases the scutellum to make certain from its punctuation that the insect was only *Q. tristis*. Murray's record is apparently quite correct, but he has confused the two species in his *Catalogue* (1853). He only gives two, "*fuliginosus*, Grav.," and then enters under this, as one of four synonyms, *Queelius tristis*, Grav.—T. HUDSON BEARE. July 26th, 1899.

COLEOPTERA IN THE NEW FOREST IN JUNE.—On June 9th last I rode down to Brockenhurst to meet Professor Beare, who arrived on the 10th, when we immediately started into the forest to see what beetles we could obtain in a few days' stay, by hard work. Hard work it was, as sweeping and beating were, almost if not quite, useless, and working at timber, to which we devoted most of the time, requires a lot of energy. The best capture of the trip was undoubtedly *Athous rhombens*, of which fine click we took some eighteen specimens, including pupal and perfect insects. We also found the larva, which is a black one; its description may be found in *Ann. des Scienc. Natur.*, 1840, 2nd ser., t. xiv., p. 41, pl. 3B, fig. 1. L. Dufour. Most of the pupæ taken we were fortunate enough to breed out by careful attention and keeping them moist. When the insect first emerges from the pupal skin it is of a pure white, the colour soon begins to appear, and it is interesting to watch the V-shaped mark on the elytra as it gradually commences to show itself. All the specimens were obtained from some old beech logs, the wood being fairly rotten. We observed that all the pupæ were quite close to the surface of the wood. Other good species out of timber were *Tomoxia biguttata* in some numbers (pupæ and perfect insects), dug out of beech; *Phloeotrypa rufipes*, in fair numbers under bark of oak, in their borings, just emerged; and *Leptura scutellata*, which turned up in nearly all the beech logs and stumps we touched (I was fortunate enough to take a specimen of *Plegaderus dissectus* in the borings of *Leptura*). A female *Leptura* was observed ovipositing in a crack in one of the logs. *Cryphalus fagi* and *Elater pomonae* were also obtained from one of the beech logs. Under bark of oak boughs, *Cullidium variabile* and *Pogonocherus bidentatus* were taken. *Lamophloeus bimaculatus* and *L. ferrugineus*, *Ditoma crenata*, *Cerylon angustatum*, and *Paromalus flavicornis* occurred under beech bark. Some dozen specimens were obtained of *Ulinocara undulata*, mostly at dusk, sitting on an oak log, from which we had removed the bark. *Sinodendron cylindricum* occurred in great numbers in a very big decayed tree, a large portion of which nearly fell on both of us as we were examining it, a proof of the destruction the beetle had wrought. At a *Cossus* tree, from which the sap was flowing, *Eppurara decimiguttata*, *Ips quadriguttata*, *Soronia punctatissima*, *Cryptarcha strigata* and *imperialis*, and *Thamnarasa cinnamomea* were plentiful. *T. cinnamomea* varies considerably in size, and we were in hopes that we had got *T. hospita* also, but this turned out not to be the case. *Thymalus limbatus* and *Liodes orbicularis* were taken at fungi on trees, *Comopalpus testaceus* by breaking up fallen oak boughs, and *Pterostichus oblongopunctatus*, as usual, under chips, under which two specimens of *Queelius lateralis* occurred. The few things taken worth mentioning by

sweeping were *Callidium alni*, *Cryptocephalus bipunctatus* *v. lineola*, F.; *Anadolodera sceguttata* and *Strangalia nigra*, in fair numbers, (*Gramoptera analis*, *Sericosomus brunneus*, *Malachius aeneus*, and *Apion genistae* (off *Genista*). Beating produced nothing whatever.—HORACE DONISTHORPE, F.Z.S., F.E.S., Chiddingfold, Surrey.

ORTHOPTERA.

Stenobothrus longicornis, Latr., and Stenobothrus parallelus, Zett.

By MALCOLM BURR, F.Z.S., F.E.S.

The commonest grasshopper, perhaps, in all Europe, is *Stenobothrus parallelus*, Zett. Various names that have been accorded to it, as synonyms, are *longicornis*, Latr., *pratensis*, Fieb., and *montanus*, Charp. But the name *longicornis*, Latreille (1802) has priority over that of Zetterstedt (1825), and, therefore, the name of Latreille should stand. But Finot has shown that the *Acridium longicornis* of Latreille is quite a distinct species that has been confused by later writers with *parallelus*, Zett., and also that *montanus* is a synonym of *longicornis* rather than of *parallelus*. *Montanus* has been regarded as the variety *alis perfectis* *explicatis* of *S. parallelus*, by Brunner, in spite of Charpentier's words, "*alis dimidia elytrorum parte paulo majoribus*." It is highly probable, therefore, that *S. longicornis*, Latr., is confused with *S. parallelus* in collections. Latreille gives as a locality, the neighbourhood of Paris, and it was at Fontainebleau that Finot took his specimens with which he has vindicated Latreille's species.

While enjoying a short stay with M. le Capitaine Finot, at Fontainebleau, during August last, I observed among long grass in a marshy spot in the Parc what I took to be *S. parallelus* var. *montanus*, as understood by Brunner. As this form is rare, I took as many specimens as I could find, and upon my return home I discovered that they were *S. longicornis*, Latr. In this species the elytra and wings are often developed better than in *S. parallelus*, and so I at once looked through my European collection to see if any were there mixed with the better-known species. Sure enough, I discovered one female, labelled "*var. montanus*, ♀. Vosges, Pierrat," from the collection of M. de Bormans. I consider it is highly probable that the two species are confused in many collections of European Orthoptera. It is very abundant in many parts of France, and there is no reason whatever why it should not occur in Great Britain. It should be sought for in marshy fields*, where it occurs in numbers, together with *S. parallelus*.

It is rather difficult to distinguish the male from that of *S. parallelus*, but the female cannot be mistaken. Finot points out the following distinctions:

S. longicornis, Latr.—Pronotum with the typical sulcus placed in the centre. Axillary vein of the elytra confluent with the anal vein at the middle of the latter. Exposed part of the valves of the ovipositor of the female twice as long as broad.

S. parallelus, Zett.—Pronotum with the typical sulcus placed slightly behind the middle. Axillary vein of the elytra of the male free as far as the actual apex of the elytra. Valves of the ovipositor ♀ as long as they are broad.

Now, this will appear but scanty ground for the separation of the

* I took in the same place *Mecostethius grossus*, L., *Xiphidium fuscum*, Latr., *Apterygida albipennis*, Meg.

species, but the antennæ are also distinctly longer in proportion in the two sexes in *S. longicornis*, and the elytra and wings, though abbreviated, are always somewhat better developed than in *S. parallelus*, often completely. The neuration of the elytra is an important point, though not always easy to observe, but the difference in the valves of the ovipositor is very striking. In the dried specimens, especially, the long valves of *S. longicornis* are noticeable at once. It is very probable that many of the references to *Stenobothrus parallelus*, Zett. var. *montanus*, Charp., really refer to *S. longicornis*, and it is not unlikely that the var. *explicatus*, Selys, also refers to this species. It appears certain that *montanus* must no longer be regarded as a variety of *S. parallelus*, but as a synonym of *S. longicornis*. The name *explicatus*, Selys, remains for the form of *S. parallelus* with perfectly-developed wings and elytra, while the intermediate form has no name attached to it, and it is perhaps as well. The curious part of it all is that *Aridium longicornis*, Lutr., has always been considered a synonym of *S. parallelus*, Zett., although published 23 years earlier. The name *longicornis* should have stood in any case.

The Orthoptera of the Channel Islands.

By MALCOLM BURR, F.Z.S., F.E.S.

The Orthoptera of Guernsey and Alderney have been admirably explored by Mr. Luff, but have apparently not yet been systematically collected in Jersey. I have received several specimens from the latter island from Mr. B. O. Cartwright. It is possible, therefore, that the following notes may be of interest, as there are one or two species recorded from these islands that are not known in Great Britain:

Forficula auricularia, L., seems to be common in all the islands; common in Guernsey and Alderney (Luff). The var. *forcipata*, Steph., has been taken by Mr. Luff on the islands of Lihou and Chapelle Dom Hue, but not in the adjacent parts of Guernsey (*Ent. Mo. Mag.*, vii., 1896, p. 20). *Labia minor*, L.—Mr. Luff tells me that this species is abundant in gardens in Guernsey; it probably occurs also in other islands. *Ectobia lirida*, Fabr.—Common in Guernsey and Alderney (Luff); Mr. Luff has kindly given me a pair, and I have also received a pair from Guernsey from Mr. S. L. Mosley. *Ectobia parviri*, Steph.—Guernsey, common in Alderney (Luff); two specimens which Mr. Luff has been so kind as to send me are of the ordinary British form, and do not approach the var. *nigripes*, Steph. *Phyllodromia germanica*, L., *Periplaneta orientalis*, L., and *P. americana*, L., occur in Guernsey (Luff). It is interesting to find the two *Ectobias* in these islands. Very probably *E. lapponica* will be taken later, most likely in Jersey.

Stenobothrus bicolor, Charp.—Abundant in Guernsey (Luff); common in Jersey (Cartwright), *Stenobothrus vagans*, Fieb.—Apparently fairly common in Jersey (Cartwright); this species does not occur in Great Britain, but is widely distributed throughout Central Europe in dry and barren places. *Stenobothrus haemorrhoidalis*, Charp.—One specimen from Jersey (Cartwright); this species also is widely distributed through Central Europe, but does not occur in Great Britain; it is quite possible that both the above species may be recorded from the southern counties of England or Ireland if carefully

sought for. *Oedipoda caerulea*, L.—Not uncommon in Guernsey (Luff); also from Jersey (Luff); I have received several specimens from the latter island (Cartwright), including some examples of a variety with a red pronotum, which I do not know from any other locality. *Schistocerca peregrina*, Oliv.—One straggler in Guernsey in 1881 (Luff); it is curious that this African species should have been taken so far north in 1881, when none were recorded in Great Britain. *Tettix subulatus*, L.—Common in Guernsey (Luff); it is strange that the commoner *Tettix bipunctatus* is not yet noticed from the Channel Islands.

Locusta viridissima, L., and *Platygleis grisea*, Fabr.—Both common in Guernsey (Luff); I have received the latter from Jersey (Cartwright).

Gryllus domesticus, L., in houses in Guernsey (Luff). It is quite probable that *G. campestris*, L., may be taken in sandy places in Jersey. *Gryllotalpa gryllotalpa*, L., occurs in Guernsey (Luff).

From the above notes it will be seen that, apart from Jersey, the orthopterous fauna of the Channel Islands resembles that of Great Britain, but is poorer, though *O. caerulea*, which is essentially a continental form, occurs. The three specimens recorded from England were very possibly imported from Jersey. It is interesting to find two continental species of *Stenobothrus* which are unknown in England, and this should excite further careful collecting.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

EGGS OF LEPIDOPTERA.—The following notes were made (when holiday-keeping) under a two-thirds, used as a hand, lens, and must be taken for what they are worth:—

Erebia ligea.—Of a pale straw-yellow or pearly-yellowish colour, with a suspicion of greenish in its tint. Viewed laterally it is inclined to an oval outline, broader at the base than at the micropylar area. There are 17 sharp-edged longitudinal ribs running from base to shoulder, afterwards uniting somewhat irregularly in pairs between the shoulder, and micropylar area around which they ultimately form a rather inconspicuous rim, the micropyle itself forms a small central stella at the apex. The eggs described were laid by a female captured at Pré St. Didier, on August 7th, 1898. [N.B.—After making the last description (*ante*, p. 220) I compared, as well as I was able, the eggs of *E. ligea* from Pré St. Didier, with those of *E. euryale* from above La Thuile. In colour, shape, number of ribs, character of ribs, and structure of micropyle, the eggs of both insects appear to be identical.]

Erebia tyndarus.—One egg attached to a box by a female captured in the Val Ferrex, on August 13th, 1898. The outline roughly oval, wider at base than at apex, the latter flattened somewhat more than the former, pale greenish in colour, the raised vertical ribs, of which there appear to be about 16, whitish; the micropylar area forms a brighter green basin, the central point of the micropyle proper being white, from which branch a series of white radii. [The basal peduncle noticed in the description of an egg of this species (*ante*, vol. x., p. 183) was not present, so that this appendage was evidently an aberrant structure. The number of ribs now given as 16, were there given as 19 (? 20), so probably there is some variation in this respect. The

differences noted in the colour of the micropyle probably represent different degrees of development.]—J. W. TUTT.

THE LARVA OF MELITAEA CYNTHIA.—Two larvæ of *Melitaea cynthia* were captured at Arolla on August 18th and 19th. These larvæ are black, with long spines, and have a golden-yellow transverse line across each segment. They appear to be half-grown, and since imagines were taken at the same time and place, and the summer where they are found (8,000ft. to 9,000ft.) is very short, the conclusion seems irresistible that the species sometimes, at least, takes two years to complete its cycle, as these must be from eggs laid last year, and could not become imagines till next year. The following is a description of the larva:—

Larva, black, with long spines carrying long hairs; there is a transverse yellow line across the posterior margin of each segment, and yellow spots that represent broken-up dorsal and lateral lines. These spots are (1), *dorsally*, several on thoracic segments and one just in front of transverse lines on abdominal; (2), *laterally*, several at bases of legs and in front and behind subspiracular tubercle, also one above this level behind spiracle and a prolongation upwards in front of spiracle. These spots seem to be broken remains of transverse lines as much as of dorsal and lateral lines. There are two spines above spiracular level on the 2nd and 3rd thoracic (none on 1st) segments; on the abdominal is also a dorsal spine; below the spiracle is one strong spine similar to the dorsal ones, then another half the length of the last, whilst lower is one that is little more than a wart.

—T. A. CHAPMAN, M.D., F.Z.S., Betula, Reigate. August 28th, 1899.

CURRENT NOTES.

Mr. Bankes gives (*F. M. M.*, pp. 178-180) a first-class account of the life-history of *Phalonia rectisana*, the larva of which feeds on the shoots of *Triglochin maritimum*, which it enters a few inches above the crown of the plant, working its way downwards and eating out the pith of the shoot. Some of them pupated in the cocoons formed in the autumn inside the old flower-stems, but many in confinement left their winter quarters and, about the beginning of April, spun new cocoons in which to pupate. On May 22nd larvæ only were found, but by June 4th many cocoons contained pupæ, the moths emerging from June 11th-17th between 9 and 11 a.m.

Mr. Corbin records (*Entom.*, p. 210) the capture, in the New Forest, of a specimen of *Anthrocra trifolii*, with the usual red parts of a smoky-black tint. Commenting on this Mr. South adds that he is not aware of a previous record of a similar aberration. We suspect that it is an example of *A. trifolii* ab. *obscura*, Tutt, "*Brit. Lep.*," vol. i., p. 487. If so, he will find similar forms noticed, *Ent. Record*, i., p. 33 (Webb), and "*Var. chez Lép.*," pp. 43, 44 (Oberthür).

In the September number of the *F. M. M.* Lord Walsingham describes *Colcophora tricolor*, a new species allied to *C. livella*, from Merton.

Collectors in the Congo Free State are now sending a great quantity of material to the Department of the Interior of "l'État Independent du Congo" at Brussels, and the writer has seen large piles of boxes as yet unpacked. The determination of the insects has been entrusted to M. E. Seeldrayers, the secretary of the Entomological Society of Belgium. Among such Orthoptera as are pinned out, none are yet determined, a pair of *Sphingolabis africana* was

noticed, the only earwigs in the collection, and several specimens of the curious *Paridalota versicolor*, Br. This curious Phaneropterid is more original than the other members of the family, for, instead of the usual pale green colour, it is dark brown, while the elytra are mainly light brown, black in parts, with a rich purple band near the anterior margin; the wings, too, are nearly black. Here are also several nice *Mecopodidae* of various genera, some doubtless being new to science.

M. Auguste Lameere, now engaged in the herculean task of writing the Fauna of Belgium, has brought home some nice things from a little-visited part of the Sahara. Among the Orthoptera, there are several *Fremiaphilidae*, *Sphingonotus*, *Fremobidae*, *Pamphigidae*, and the adaptation of these creatures to desert life is extremely striking.

All who have collected insects must have often noticed the sudden disappearance from certain localities of insects which had a short time before been very abundant. M. Lameere discovered the very local Dectid, *Stampsocleis glabra* in great numbers in a place in Belgium. For two years there was no noticeable decrease in their numbers, but the third season none were to be seen. M. le Baron du Selys-Longchamps has noticed this same fact with regard to dragonflies at a certain pool not far from Liège, and the writer found *Homophocerus rufus*, L., in great numbers at the eastern end of the Folkestone Warren in 1896, but in the following year not an individual was to be seen. Dr. Krauss has informed us that he has observed the same phenomenon in connection with *Conocephalus mandibularis*, of which a whole colony, once flourishing and numerous, completely disappeared. It is an interesting question, and deserves to be worked out in detail.

NOTES ON COLLECTING, Etc.

TINEA SIMPLICIELLA IN NORTH KENT.—It may interest the readers of the *Entomologist's Record* to know that Mr. George Bird and myself had the good fortune to capture five specimens of the rare Tineid, *Tinea simpliciella*, in North Kent, on July 26th last.—N. CHARLES ROTHSCHILD, B.A., F.Z.S., F.E.S., 148, Piccadilly, W. July 28th, 1899.

AGROTIS PUTA IN JULY.—In answer to the Rev. G. H. Raynor's question (*ante* p. 207) whether any of your readers remember taking *Agrotis puta* before August, I may mention that in *Ent. Record*, iii., 183-4, I recorded the capture by myself, at sugar, of a fine specimen of it at Corfe Castle, on July 23rd, 1892, while Mr. Tutt, in an editorial note appended to mine, there states that in early seasons he has taken beautiful specimens of *puta* at Deal during the last week in July. Again, during the present season I took, at electric light here, a fine female of this species on July 21st, a worn female on July 27th, and a male in pretty fair condition on July 30th.—EUSTACE R. BANKES, M.A., F.E.S., The Close, Salisbury. August 26th, 1899. [We find that in 1885 and 1886 we captured examples of this species in Greenwich marshes between July 18th and 20th of each year. The specimens then taken were males. Ed.]

THE NEW FOREST AT WHITSUNTILE.—I was at Lyndhurst at Whitsuntide this year, but owing to pressure of business I have been unable to send in my experiences until now, though I kept my diary regularly

during my four days' visit. The weather was unsatisfactory, being very changeable with frequent rain, and a good deal of wind, but there were some bright intervals of sunshine, and I found things generally very backward. Amongst the butterflies that I noticed were a few *Brenthis euphrosyne*, *Pararge megera*, *Pieris napi*, only one *Cyaniris argiolus*, and several *Syrichthys malca*. I saw one *Macroglossa fuciformis*, or *M. bombyliiformis*, but could not distinguish which, as it was too quick for me. Very few of the rhododendrons were in flower, and though I diligently watched the azaleas, I saw no more "beehawks." I obtained a few *Epiphyra punctaria* by beating holly, and could not get them out of anything else. *Phytometra viridaria (aenea)* was common on the heather with *Ematurga atomaria*, which latter was the commonest insect met with during my visit. A day's search for *Nemoria viridata* only resulted in one specimen in perfect condition. The species was evidently not out. I expected to meet with *Nemeobius lucina*, but did not come across a specimen, though I visited a locality where I have taken it in former years. I captured a female *Spilosoma mendica* on the wing flying in the sunshine about mid-day. Is not this unusual? I did not collect any larvæ owing to the difficulty of rearing them here in Kensington. Referring to my note on an autumnal emergence of *Spilosoma lubricipeda* last year (*Ent. Record*, vol. x., p. 255), it may be worth while to add that the pupæ forming the remainder of the brood, and which were kept in an inverted bell-glass during the winter, duly produced imagines commencing May 14th, the last emerging on June 1st. Only those kept in a cardboard box came out last autumn. Other pupæ kept in a room without a fire, with the window always open have produced imagines pretty well up to their ordinary dates. These included *Smerinthus ocellatus*, *Dicranura vinula* (some remarkably dark specimens from Seaford and Barnes), *Euchelia jacobaeae*, and *Apatela aceris*, but I have still one each of *Smerinthus ocellatus* and *Dicranura vinula* in the pupa state.—H. AINSLIE HILL, F.Z.S., F.E.S., 9, Addison Mansions, Kensington, W. August 22nd, 1899.

ABUNDANCE OF MACROGLOSSA STELLATARUM.—*M. stellatarum* appears to be very abundant this year, I have seen a great many in the garden here at Enfield.—H. M. EDELSTEN, F.E.S., Forty Hill, Enfield.

REVIEWS AND NOTICES OF BOOKS.

THE CAMBRIDGE NATURAL HISTORY (VOL. VI.).—INSECTS (PT. II.). By David Sharp, M.A., M.B., F.R.S. Demy 8vo. 626 pp. Macmillan and Co., London, 1889. Price 17s. net'.—'This volume contains the completion of the Hymenoptera, Coleoptera, Strepsiptera, Lepidoptera, Diptera, Aphaniptera, Thysanoptera, Hemiptera, and Anoplura. It is totally impossible, in the space at our command, to do justice to the excellent work that Dr. Sharp has given us in this volume. That it will (with the preceding volume) be the standard work of general entomology in this country for some time to come is certain, whilst the method of treatment, the lucidity and clearness with which more or less technical detail is elaborated, and the general excellence of the material that appeals more particularly to the specialist, leave no doubt that its success must be both assured and permanent. The volume contains an account of the Coleoptera, the author's own special order, and, as

might be expected, this portion of the work is especially well done and complete. The chapter on the *Formicidae* is, however, quite one of the most important scientifically and interesting from the general standpoint that we have yet read. The prominent part that the Diptera have played in the more recent work of such specialists as Osten-Sacken, Weismann, Lowne, and others, has led to our having a much more exact knowledge of the phenomena attending metamorphosis in this order than in any other, and this work has been remarkably well summarised and dealt with by our author, whilst the treatment of the Hemiptera leaves little to be desired. One is agreeably surprised to find such an excellent general account of the Lepidoptera condensed into so small a space. Accepting the two main divisions of Rhopalocera and Heterocera, the author enters into a brief summary of the principal families and subfamilies. He accepts the general conclusions of Meyrick, but follows, in his treatment of the Heterocerous families, the "key" given by Hampson in the *Fauna of British India*—*Moths*, an arrangement based essentially on the neururation of the imagines. We are pleased to see the prominence that is given to the work of Chapman in this order, whilst the author's remarks on the *Micropterygidae* (= *Erioccephalidae*) and *Eriocraniidae* (= *Micropterygidae*) are exceedingly interesting. Too much cannot be said in praise of this work, which offers to the general naturalist, as well as to the specialist, a thoroughly reliable text-book that is distinctly in advance of any other work of a similar kind yet published in the English language. The book is well produced, the type clear, the printing good, the illustrations accurate and to the point. We could have wished though that the paper would allow one to make marginal notes, but an attempt, on p. 418, where *ridens* occurs for *tridens*, to put in the "t" has ended in an ugly blotch, the ink running as if put on blotting-paper.

NEW ZEALAND MOTHS AND BUTTERFLIES. By G. V. Hudson, F.E.S. [Quarto 144+xx pp., xiii plates (chromo). Published by West, Newman, and Co., 54, Hatton Garden, E.C. Price £1 5s. net].—In this work the author gives a short general introduction of the structure and transformations of Lepidoptera, a brief account of the Darwinian theory of the origin of species, and a summary of recent views of classification, mainly, however, restricted to that of Meyrick, which are followed in the systematic portion of the book. The latter consists of five chapters, and whilst these show how much has already been done in New Zealand in the families treated of, they also exhibit the vast amount of work, especially in the early stages of the species, that remains for the lepidopterists of New Zealand yet to complete. It is to be expected that an author who writes of New Zealand Lepidoptera would follow Meyrick (who has done so much scientific work in that country), but one is so absolutely befogged at the loss of the old landmarks, that one is often bewildered as to where one is. To criticise the inclusion of the *Geometridae* in the Notodonts and similar vagaries would be to cover again ground that has already been well trodden and for which our author is only responsible so far as he has adopted without demur, a system that appears to us utterly illogical and scientifically indefensible. Apart from the arrangement, the systematic part of the work appears, so far as it goes, to be carefully and accurately done, the descriptions of the perfect insects are good,

the notes on habits most interesting, but those of the early stages are as a rule, exceedingly unsatisfactory. The egg is rarely mentioned (certainly no microscopical descriptions appear); the descriptions of larvæ, when given, are usually of the crudest, and give no hint as to the structural points now known to be of importance, although it is clear (*e.g.*, p. 16, *Melanchra insignis*) that the author has had the larva and bred the imago, and hence the possibility of a scientific description of larva and pupa has not been wanting. We would insist that the statements that "the egg is at first white and soon becomes dull brown," that "the larva has twelve legs; it is much attenuated towards the head; its colour is pale green, darker on the back; there is a number of wavy white lines and dots on the larva, as well as a few isolated black dots and hairs," useful as they may be, do not comprise salient points of structure. One wants to know the essential characters of the egg, and the larva—the shape, position of the micropyle, and ornamentation of the former, the exact position and nature of the setæ, warts, prolegs, &c., of the latter. We do not wish it to be understood that these are the leading features of the book, we only mention them so that in the next volume more scientific details may be given and so that the author may bring himself into line with the more modern requirements as recognised in this country and North America. Having had our growl as to what we should like to have seen in the book, we must turn to the other side. The work is of great value in bringing together from scattered sources, systematically arranged, the information that has been published on the Macro-Lepidoptera of New Zealand, the original work shows, on the whole, not only industry and care, but is, in some cases, really good—the account of *Hepialus virescens*, *Ecteticus omnivorus*, *Urechis floccosa*, &c., being especially interesting. We observe that the author treats *Pyrausta kershawii* as *P. cardui* since "both forms occur together in South Africa, and the differences do not appear to be sufficiently important to merit a distinct specific name." The author's first-class coloured drawings (probably the most prominent and best feature of the book), are excellently reproduced by the publisher, the latter's work, both in the general get-up, printing, &c., leaving nothing to be desired. Altogether, in spite of what may be considered as our adverse comments, it is an important and useful volume that must be in the libraries of all our societies, as well as on the bookshelves of all those who are interested in exotic Lepidoptera.

A CATALOGUE OF THE LEPIDOPTERA OF NORTHUMBERLAND, DURHAM, AND NEWCASTLE-UPON-TYNE, PT. I. By John E. Robson, F.E.S. [Demy 8vo. 195+iv pp. Williams and Norgate, 14, Henrietta Street, Covent Garden, London. Price 7s. 6d.]—The first part of this long-promised list contains the Papilionina, Sphingina, Bombycina, and Noctuina. One may say at the outset that the *Catalogue* was well worth waiting for, and we desire to offer the author our hearty thanks for the careful labour bestowed on it. It contains not only a list of the species occurring in the district, but the references to these in the works of Stainton, Newman, Barrett, Meyrick, and Buckler, together with full notes and observations made by the author on each species. This latter feature it is that gives the *Catalogue* its greatest value, for the author's intimate acquaintance with the district dealt with, his exact knowledge of the insects, and personal intimacy with many of the collectors referred to, have placed him in an unrivalled position for giving us a

complete and accurate *Catalogue*, in which all doubtful records are criticised in the light of modern research and knowledge. The author's conservatism in matters lepidopterological leads him to adopt the arrangement of three-quarters of a century ago, and hence we find the Anthrocerids and Sesiids united with the Sphingina, the Cossids, Hepialids, Nolids, Lithosiids (including the Arctiids), Liparids (which include the Psychids, Lasiocampids, Saturniids, and Drepanids), and Notodonts under the term Bombycina, &c., but in a reference list this matters little, the important point being to find the information one wants readily and without loss of time. But one cannot help asking why the author makes *Polygonia c-album* congeneric with *Vanessa io*, why *Hepialis* and *Cossus* are placed in the family *Zenzeridae*, why the Psychids are placed with the *Liparidae*, and why the Lasiocampids, Saturniids, and Drepanids find themselves in the same family? Is our author sure, too, that *calvella* (= *hirsutella*) is an *Epichnopteryx*, or that *arcuosa* is a *Hydrilla*? Can he tell us, too, why *Bryophila perla* finds itself between *Heliodon arbuti* and *Phytometra aenea*, and *Sarothripa rrayana* between *Anarta myrtilli* and *Gnomoptera libatrix*? We ask these questions in no carping spirit, but simply because we believe that every entomologist of repute and wide knowledge makes no such startling innovations without reasons, which, we can readily understand, cannot be given in a *Catalogue*. To suggest, however, that these features really detract from a *Catalogue* well-conceived and excellently carried out is absurd, and the information given is so exact and important that no entomologist can really afford to be without it. We can only hope that for the advantage of our study the second part may be issued without undue delay and that the boon that the author has conferred on all those who are interested in the geographical distribution of our species so far as the families already dealt with are concerned, may be extended to those who are interested in the smaller species at as early a date as possible. The *Catalogue* is, on the whole, well printed, although the printers have muddled up capital and small initial letters for specific names in a marvellous way and have with a most independent hand placed authors' names in or out of brackets apparently as the fancy pleased them.

DIE PALÆARKTISCHEN GROSS-SCHMETTERLINGE UND IHRE NATURGESCHICHTE, Band ii., Abt. 1., Bearbeitet von Max Bartel [Pt. i., pp. 48. Ernst Heyne, Leipzig, 1899. Price 1s. 6d.].—The first volume of this excellent work (written by the late Fritz Rühl) has become probably the most widely used of the many books on Palearctic butterflies, and the present part (the first of the second volume) relating to the moths, suggests that, when complete, this will be as useful as its predecessor. So far as it goes, the information relating to the species already treated of, appears to be excellent, and the general remarks on the *Sphingidae* (the family with which the volume opens) appear to be useful and to the point. It is certainly a book for the library of every entomologist, and we trust that lepidopterists will generously support Mr. Heyne in his attempt to give us a work that deals with the Palearctic moths in such a form that their life-history, variation, and distribution over the Palearctic area, can be at once discovered without wading through a multitude of Continental magazines, the series of some of which are now commencing to assume alarming proportions.

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The Lepidoptera of the Simplon Pass.

By J. W. TUTT, F.E.S.

On July 27th, 1899, we rode over the Simplon Pass from Brigue to the little village of Simplon, and on August 6th we returned by the same route. The magnificent scenery is quite equalled by the abundance of the flora and insect fauna, and we observed large numbers of Lepidoptera on both sides of the pass. Our headquarters for the intermediate time was at Simplon, and a large number of insects (of comparatively few species, however) was obtained there, but the roads of the pass itself formed no mean collecting ground, and a damp spot on the roadside, a damp bank, or the drainage of a manure-heap in a cow-yard would produce between 11 a.m. and 3 p.m. a fair share of the fauna of the district, whilst passers-by such as *Colias hyale* and *Pieris daphidice* were occasionally to be met with. Only such insects as were on the pass itself are enumerated in this note. The rocks by the roadside produced large numbers of Gnophids, of which *Gnophos obfuscata* was the chief and perhaps the most abundant, *Larentia flavicinctata*, *L. caesiata*, *L. olivata*, *L. aptata*, *L. nobiliata*, *Scoparia sudetica*, &c. The most abundant insects in the early morning are *Tanagra atrata* (*chaerophyllata*), *Cleogene lutearia*, and *Larentia verberata*, which are simply in thousands, flying everywhere, whilst scarcely less abundant is *Ortholitha mensuraria*, and *Setina aurita* is also very frequent. Of the butterflies *Parnassius apollo* is everywhere in evidence. The common Erebias of the roadsides are *Erebia tyndarus*, *E. goante*, *E. pitho* and *Melampias melampus*, whilst *Erebia euryale* is much less abundant, commoner, however, in the larch woods on the slopes just below the first refuge above the Simplon village. The males of the common Erebias imbibe at the damp places on the roads, but the females must be netted from the flowers that border the roadsides everywhere. For a short distance between the village and the refuge, we discovered that these were mixed with a fair sprinkling of *E. mnestra*, all males, the locality for the females (and hence the headquarters of the species) remaining undiscovered. *Coenonympha* var. *darwiniana* was also here, but the specimens were quite useless for setting. *Chrysophanus virgaureae* was everywhere in fine condition, but *C. hippothoe*, evidently abundant a little earlier, was over, and one had to make excursions to the flower-covered patches off the main road for the beautiful *C. gordius*, the male slightly tinged with violet the females of the most brilliant

coppery hue, which was also going over, whilst *C. alpina*, sometimes considered a form of *C. dorilis*, produced an abundance of worn males and two very fine and perfect females. The only "whites" of the roadsides below the refuge were *Aporia crataegi*, *Pieris napi* and *P. rapae*, the first named still in fine condition, *P. napi*, very typical, and *P. rapae*, rather large, whilst the only two common Argynnis were *Argynnis aglaia* and *A. niobe*, the latter very fine and the females almost all with silvery-spotted undersides. Below Simplon, however, *Brenthis amathusia*, quite over as to condition, was still abundant. The common "skippers" were *Syrichthus alveus*, literally in millions, the females browner and less spotted than the males, *Thymelicus lineola*, the females still fresh and some with a fine dark marginal border to all the wings, and *Pamphila comma*, of which the ab. *flava* was not infrequent. These species revelled in the hot steam rising from any damp bank that directly faced the midday sun, as well as on the damp roadsides. On one spot, as we passed, we observed a commotion as of a disturbed beehive, and on examining the hundreds of insects our passing had disturbed, we found them to consist almost entirely of *Syrichthus alveus*; such a mass of butterflies we have, we believe, never witnessed before in so restricted a space. Occasionally a fine purple-black *S. sao*, with its clear cut marks, might be observed. Of the "blues," *Polyommatus corydon* was the most common, *P. astrarche* scarcely less so, *P. hylas* not common, *Plebeius argus* very abundant, and mixed with these, were a few very fine newly emerged *Polyommatus eros*, *P. donzelii* and *P. orbitulus*, whilst a magnificent large form of *Lycaena arion* patronised the waste, flower-covered corners by the roadsides. *Scopula aerealis* was in hundreds on every patch of waste ground, whilst *Crambus radiellus* and *C. spuriellus* were also abundant, although we captured few. Above the refuge, on the south side, the character of the pass changes somewhat abruptly, and insects appear to become scarcer, although *Erebia goante*, *F. tyndarus* and *M. melampus* remain abundant. *E. pitho* is here rare (probably not yet emerged at this elevation, as it is much more abundant below than above the village of Simplon), and want of time did not allow us to search the huge basin at the top of the pass, although it is possibly too closely grazed to produce much in the way of Lepidoptera. Here *Brenthis pales* and *Colias phicomone* come down to the road-level. *Pieris callidice* and *Melitaea cynthia* are on all the hill-tops round, whilst *Anthrocera erulans* occurs on the topmost slopes, and *Melampias epiphron* occurs in damp grassy places. *Fidonia brunneata* is to be disturbed from the Alpine rhododendron, and in this upper part of the pass Mr. Edwards captured a huge ♀ *Deilephila euphorbiae* somewhat the worse for wear, however, seated upon a rocky wall. Whether this was a late native, bred in these high altitudes, or an early example of the second brood that had made its passage from more southern parts, one can only hazard a conjecture. *Aglais urticae* and *Pararge maera*, as may be expected, quite dominate the pass, flying along the road at all elevations. At the summit is a good hotel, and it would be an excellent place from which to work the higher slopes of the mountains around for *Erebia glacialis*, *E. gorge* and *Melampias eriphyle*, all of which are reputed to occur here. What strikes one most is, however, the amazing difference between the wealth of the insect fauna on the north and south sides of the upper part of the pass. For the upper two miles of the south side,

as we have said, there is nothing, or next to nothing, of importance except a few purely Alpine species, but the moment one passes the hotel at the summit and commences the descent to Berisal the sport begins. The roads are covered with insects—*Erebia pitho* (at a much higher level than on the south side), *E. goante*, *E. tyndarus*, *M. melampus*, *Parnassius apollo*, *Satyrus alcyone*, *Polyommatus corydon*, *P. astrarche*, *P. icarus* (not seen on south side), *P. donzelii*, *Chrysophanus virgaureae*, *Pararge maera*, *Hipparchia semele*, and many other species occurring in the greatest profusion down to Berisal, and puzzling one by their abundance at such a comparatively high elevation. For some miles below Berisal insects appear to be particularly abundant, and *Argynnis niobe*, *A. aglaia*, and *Melitaea didyma* make very striking features by the wayside, whilst *Dryas paphia* was also frequently observed. Lower again *Colias hyale* and very brightly-tinted *Gonepteryx rhamni* add colour to the scene, whilst *Papilio machaon* and *P. podalirius* arouse one's ardour for a chase. Some insects, such as *Melanargia galathea* and *Epinephile lycaon*, appear to be in amazing profusion, others such as *Limenitis camilla* are only to be occasionally observed. *Pyrameis cardui*, *P. atalanta* and *Colias edusa* were observed near Brigue, and many other species that slip one's memory. It may be well here to note that, below Simplon village, *Erebia pitho* quite outnumbers *E. goante*, whilst above the village *E. goante* is much the more abundant, on the north side of the pass *E. pitho* reaches quite as high as *E. goante*, and is, so far as our observations went, the more abundant at the highest levels. *Anthrocera transalpina* appears to be the only common species of this genus to be found by the wayside, although below Simplon *A. purpuralis* (*minos*), and *A. medicaginis* were both somewhat common. Such are a few of the insects seen by the wayside in a rapid run over the pass in early August. Possibly this may attract a paper from some other of our many observers who have made observations on the fauna earlier in the year, when *Polyommatus lycidas* is still to be had at Berisal, and the early *Erebias* have not been replaced by the later ones.

Description of a new Talaeporiad species :—*Talaeporia vernella*, n. sp. With a further description of *T. defoliella*, Cnst.

By A. CONSTANT (Member of the Soc. Ent. de France).

TALAEPORIA VERNELLA, Cnst.—♂. Envergure : 11-12mm. Fond des ailes supérieures d'un gris jaunâtre ou argileux, semé irrégulièrement sur toute sa surface d'un assez grand nombre de traits noirâtres, très courts, ordinairement plus épais sur la côte, et formant chez les sujets en bon état une sorte de réseau à mailles plus ou moins serrées; quelquefois une bande transversale de même couleur, étroite, interrompue, contourne l'extrémité de la cellule, et aboutit un peu avant le milieu du bord interne, sur lequel sa présence n'est souvent indiquée que par une petite tache obscurément quadrangulaire. Angle anal peu saillant, arrondi, presque effacé. Frange de la couleur du fond, distinctement entrecoupée de noirâtre. Ailes inférieures d'un gris pâle uni. Dessous des quatre ailes de la même couleur que le dessus, mais sans reproduction sensible des traits et dessins des supérieures. Corps entièrement d'un gris-brun. Antennes brunes, avec deux rangs opposés de cils courts. La ♀ n'est inconnue. Alpes-Maritimes en mars. Beaucoup d'exemplaires.

Espèce un peu voisine de l'*alpestrella*, mais toujours plus petite, d'environ 3mm.; sa tête est brune et non blanchâtre; ses ailes sont d'un teinte plus foncée, et les supérieures sont plus chargées d'atomes noirâtres. J'aurais désiré établir une description comparative avec la conspur-

catella; mais de cette dernière, très-rare jusqu'ici, je n'ai pu voir aucun sujet authentique, car je doute fort que l'espèce rencontrée récemment aux environs de Paris par un de nos collègues, et qu'il a répandue dans les collections sous le nom de *conspurcatella*, soit réellement distincte de celle que je viens de décrire sous le nom de *vernella*; pour ma part, après examen minutieux, je ne puis constater, entre les deux types, aucune différence appréciable. Si donc il était avéré que l'espèce parisienne fût la vraie *conspurcatella*, la *vernella* dont il s'agit ici devrait aussi lui être réunie: sinon, je maintiendrai la dénomination de l'espèce ici décrite, puisqu'elle n'a encore été publiée par aucun auteur.

TALAEPORIA DEFOLELLA, Cnst.—♂. Envergure: 8-9mm. Ailes supérieures à bord interne plus arrondi que chez la plupart de ses congénères, à fond jaunâtre argileux, presque complètement recouvert d'atômes bruns très serrés, quelquefois vaguement disposés en réseau; ordinairement, vers le milieu du bord interne, une petite macule brune, accompagnée en avant et en arrière d'un point blanchâtre. Frange grise, à peine entrecoupée de traits plus foncés. Ailes inférieures un peu plus pâles que les supérieures. Dessous des quatre ailes d'un gris soyeux uni, un peu plus clair aux inférieures. Tête, corps et pattes, gris-brun. Antennes brunes, très faiblement pubescentes. La ♀ m'est inconnue. Alpes-Maritimes, en Novembre, dans les bois de pins. Six exemplaires.

Dans ce genre *Talaeporia*, où certaines espèces sont si voisines les unes des autres, celle-ci pourra être considérée comme bien distincte. D'abord, c'est la plus petite des *Talaeporia* connues, et on ne peut guère la comparer à aucune autre. En outre, l'époque tardive de son éclosion viendra apporter un témoignage de plus à la validité de l'espèce.

Talaeporia (Bankesia, Tutt) staintoni, n. sp. and montanella, n. sp.

By the Rt. Hon. LORD WALSLINGHAM, M.A., LL.D., F.R.S.

In the *Ent. Ann.*, 1868, pp. 127-9, Stainton refers to *Solenobia conspurcatella*, Z., first detected in Tuscany by Mann, in 1846, and identifies with it specimens received from M. Fologne, taken near Brussels, and from Mr. A. H. Swinton from near Southampton. My friend M. Constant has met with a species near Cannes, and I have taken another in Corsica—both of which are at least nearly related to *conspurcatella*.

In "*Insect Variety: its propagation and distribution*" (1880), by A. H. Swinton, a letter from Mr. Stainton is quoted (p. 2), in which he mentions specimens taken at Fontainebleau, which he fancied to be the same as the Belgian and Southampton forms. M. Constant informed me that he submitted his species to Dr. Rebel, of Vienna, who has made a special study of this group, and that he regarded it as a new and distinct species. Dr. Rebel was acquainted with the existence of only two specimens of the true *conspurcatella*, Z., one in his own collection the other in the Vienna Museum.

Zeller's collection contains but one of the twenty ♂♂ which Mann took at Pratolino and Pratovecchio, in 1846—this is the type described by Zeller as "*conspurcatella*, Kollar, *in litt.*;" another specimen without locality, received from Schulz, appears to be the same.

When on the point of describing the Cannes species M. Constant received as *conspurcatella*, from a friend in Paris, specimens taken there which he regarded as in no way differing from his own, and later, also

from Dr. Staudinger, similar specimens under the same name, evidently from the same Parisian source.

If Dr. Rebel were correct in separating the Cannes species from the true *conspurcatella*, and in this I entirely agree with him, the question arises whether M. Constant is equally correct in his recognition of the Parisian specimens as identical with his own, in which recognition he appears to be at variance with Stainton's opinion, since the supposed *conspurcatella* from Southampton is certainly not the same as the Cannes species, although Stainton thought he remembered having seen specimens in a mixed series taken in March, 1867, at Fontainebleau. As Stainton had no opportunity of comparing the specimens together, there is no sufficient reason at present for distrusting Constant's determination, and we may presume that the Parisian species is the same as the more southern, and, therefore, not the true *conspurcatella*.

It should be obvious at least that the Paris species referred to by M. Constant cannot be the one of which de Réaumur found females in that neighbourhood (subsequently named *lapidella* by Göze), for *lapidella* conforms to the genus *Luffia*, Tutt, in its pectinate not ciliate antennæ, and in its more pointed case, and could not, therefore, be mistaken for *conspurcatella*. Stainton's type of *Solenobia douglasii* (thanks to Dr. Mason and Mr. Tutt) is now before me, it strongly recalls, and has actually been mistaken for, *stantoni*. One might presume that this conformity would be also indicated in the larval stage, but in any case neither *douglasii*, *vernella* (Cnst. MS.), nor *stantoni* are identical with the true *conspurcatella*.

Should anybody be so fortunate as to breed a ♂ of *pomonæ*, or active enough to get up *before sunrise* to catch *douglasii*, it would not surprise me if they turned out to be the same.

BANKESIA MONTANELLA, sp. n.

Antennæ biciliate (2½); pale cinereous, banded with pale brownish-fuscous. *Palpi* loosely clothed, pale cinereous. *Head* and *thorax* brownish-cinereous. *Forewings* slightly shining, pale yellowish-cinereous, with pale brownish-fuscous speckling on the basal half, becoming less frequent beyond the middle and more confluent around the apex and termen, where it forms a series of small irregular spots; a spot of this confluent speckling occurs about the middle of the costa, and is followed by a rather more conspicuous costal spot a little beyond it, with two or three, less noticeable, between this and the apex; on the dorsum is also sometimes a confluent spot before the middle; in the amount of confluence of the darker shade-speckling, specimens vary considerably, the tendency to such confluence being to form a shade at the base, one or two shade-spots on the cell, the outer one always at its end (in addition to the marginal and apical spots already noticed); the cilia are of the pale ground-colour of the wing, but show a slight brownish-fuscous shade running through them near the base, not, however, reaching to one-half of their length. *Exp. al.* 11mm.-12mm. *Hindwings* pale grey; cilia shining pale greyish-cinereous. *Abdomen* greyish-fuscous. *Legs* pale brownish-cinereous, tarsi very faintly pale-spotted. *Type* ♂ (81,616) Mus. Wlsm. (♀ ignota). *Habitat* Corsica—Vizzavona, May 9th-15th, 1896 (26 specimens, IVLsm.).

This appears to be most nearly allied to M. Constant's Cannes species, but is distinguishable by the larger proportion of the pale ground-colour on the forewings, especially between the end of the cell and the apex; the hindwings are also somewhat more acutely pointed. I am unacquainted with its larval habits, not having met with the case, although I carefully searched the many rocks which crop up among the mass of low junipers (*Juniperus sabina*), over which the male flies

in the early morning at a considerable elevation, near Vizzavona, on the slopes of Monte d'Oro.

BANKESIA STANTONI, sp. n. (= **CONSPURCATELLA*, Stn., nec. Z.).

We have now to deal with the British species hitherto confused with *conspurcatella*, Z. A careful description by Stainton will be found, *Ent. Ann.*, 1868, 128-9, (Pl.) fig. 3, of which I have the original MS., but as this was evidently taken from Belgian specimens sent by M. Fologne, before Mr. Swinton's English specimens were received, it cannot at present be safely applied to an English type, although it would fit it extremely well. As compared with the true *conspurcatella*, Z., it may be observed that the English species is distinctly darker, the ground-colour having a more yellowish tint, the darker markings being more distinctly *brownish* (not "gelbbraunen," as described by Zeller); the hindwings are much darker than in any other species of the *conspurcatella* group, and have a purplish tinge. The forewings are also slightly less elongate, and with a more rounded apex, having a generally more abrupt appearance. The legs and abdomen are also of a much darker shade, to which the terms of Zeller's description of *conspurcatella* ["Körper gelbbraunlich mit bleich-ocherbräunlicher Behaarung und solchen Fühlern und Beinen" (*Linn. Ent.*, VII., 356)] could not apply. Another very noticeable point is that in the true *conspurcatella* the outer half of the cilia of the forewings is pale yellowish, as described by Zeller [*loc. cit.* 357] "Franzen an der Wurzelhälfte braungrau, aussen bleich-gelblich", whereas in the British species they are noticeably shaded by a series of strong brownish-fuscous streaks running through them from the dark basal portion, which, however, in both species, occupies somewhat less than one-half of their total length. Herrich-Schäffer's fig. 365 greatly exaggerates the tessellation of the outer half of the cilia, of which there is but the faintest possible indication in Zeller's type.

Mr. Tutt now informs me that the Brussels specimens are most certainly the same species as our British *conspurcatella*. It would be appropriate to apply to this the name *stantoni*, founded upon an English type.

We are thus able to recognise at least four distinct species belonging to this group, but I will not anticipate anything that may be written by M. Constant or others in regard to the form prevalent near Cannes (*vernella*, Cnst. MS.), especially as I am by no means certain that *one species only* occurs there.

POSTSCRIPT.—The following remarks occur to me after reading the proof of M. Constant's descriptions. Constant [*Bull. Soc. Ent. Fr.*, 1895, pp. li-lij] originally described *Talacporia defoliella*, from the Estérel, beginning of November; he now, in different terms, *re-describes* it from Alpes-Maritimes, November, in pine woods. Six specimens, *exp. al.* 8mm.-9mm., whereas the original measurement was 8mm.-10mm.

He describes *vernella* from Alpes-Maritimes in March (♀ unknown). It thus appears that he has not succeeded in breeding either of the two or more species of which the cases are very abundant in the foot-hills of the Estérels, from Agay to Napoule. I have met with no better success myself—my cases were collected in May.

Ragonot made a MS. note in his copy of Staudinger's *Catalog*,

"*vernella*, Cst., St. Martin Vésubie" (this is equivalent to St. Martin Lantosque, 85 miles inland from Nice, in the high mountains, 8,210ft.)—the information must have been received from Constant), and it is probably the species mentioned by Millière (*Cat. Léop. Alp.-Mar.*, 295) under the name "*lapidella*, Goerge" [† Göße]; in a note Millière added "dans le Lyonnais l'espèce vit au pied des collines, et dans la plaine," and gave June and July as the time of its occurrence. Admitting that Fologne rightly determined the Lyons species as *lapidella*, we suspect that Millière introduced the species into his Catalogue solely on the evidence of larvæ which he never reared. His collection went to the Paris Museum with the Ragonot Collection, and it would be interesting to establish, by studying his specimens, whether his *lapidella*—if he possessed the perfect insect from Lantosque—is Constant's *vernella*, and whether Millière's *conspurcatella* (of the same list) is Constant's *defoliella*. It is almost certain that two species occur at Cannes, one of which may or may not be identical with that from Lantosque. In short, is the species now described by Constant, *vernella* (Cannes), or *vernella* (Lantosque), or both, and is the type the species with the broader or narrower forewings?—for in this respect my specimens received from him differ considerably. Again, what is his *defoliella*, with the antennæ weakly pubescent?—this character is certainly not found in *Banksia* or *Luffia*, and separates it generically from *vernella*.

Collecting Lepidoptera in the Norfolk Broads.

By W. J. KAYE, F.E.S.

Following an outing to Wicken for the August Bank Holiday I this year decided to try my luck in the Norfolk district, rather generally and vaguely termed the "broads." The term "broad" is, strictly speaking, applied to the large sheets of water found in various places in close proximity to a river (whichever it may be). The collecting is chiefly to be done on the strips of fen which skirt the river (in my case the Bure) at various places, and in the occasional large patches of fen where the neighbouring country is very flat. I made the acquaintance of Mr. James at Wicken, and, in response to my invitation, he joined me late on the night of August 9th at a charming village, from whence Horning was not many miles distant. Although it was 8.45 p.m. before we could get out to work we determined not to lose a single evening at light. Our first impressions, in the dark, of our new collecting-ground, were the very antipodes of those we had expected to receive—low undulating ridges of country and well wooded. However, in course of time we reached Horning, and there we were surprised to find that, instead of a large expanse of flat country, there was only some marshy land bordering the river. We had carted (wish we had!) the "light" (?) apparatus down with us, but as we neared the river an ominous fog told us what to expect; and the fog was right—we got nothing, unless one counts a worn *Phibalapteryx vittata* (*lignata*) and a similar *Acidalia immutata*. Next day we tried sweeping in the fen and took a couple of *Plusia festucae* larvæ, but our vigorous efforts in this direction were not rewarded, and we chartered a boat at the ferry and went in search of *Nonagria cannae* pupæ. Up one of the creeks the bullrushes (the large species, *Typha latifolia*) had a very sickly

appearance, and we quickly found pupæ of what were, without doubt, *N. arundinis* (*typhæ*), but *N. cannae* was not there, and we tried the small 'bullrush' (*T. rotundifolium*), but the species obtained was the same, and the hundreds if not thousands of plants searched failed altogether to give a single *N. cannae* between us. A very large percentage (about 60 per cent.) of the *N. arundinis* were ichneumonid, but those that did hatch were remarkably fine. The day work we closed early, but were off again for the very earliest of twilight flyers. *Nudaria senex* showed itself and was boxed, and was quickly followed by *Lithosia muscerda*, and then the fog again began rising, and although we persevered with the light the result was *nil*. The following day the work was of the same description as previously. A boat (the hire of which is only from 1s. to 1s. 6d. per diem) was chartered, and a *cannae-typhæ* search was organised; joined to these two names we might add *N. sparganii*, but I will quickly take the strain off your readers' minds by saying that *Sparganium ramosum* was not tenanted by this desirable species. Speculations as to fog coming on later were entertained freely, and every speck of cloud was welcomed, as we knew that this would stay the too rapid radiation of the day's heat. Dusk came on, and *L. muscerda* and *P. vittata* were again taken. Then we both kept netting *Leucania impura* in anticipation of its being something better. Presently my friend hailed me to come and examine a "wainscot." I pronounced immediately, "You have got it; it is *Leucania brevilinea*!" This gave us an impetus that it would be hard to describe. The lamp was lit, while one attended to the still twilight-flying species. Very soon Mr. James had another *L. brevilinea*, and I then just saved my reputation by taking one flying round the lamp. Fluttering up the reed-stems *Charaæa graminis* ♀s were netted, and varied from examples with deep brown-black ground colour to the reddish form. They were of the usual fine size met with in the Cambridge fens. Only females were taken. *Acidalia immutata* and *Cataclysta lemnata* turned up at the light, and then the clouds rolled by and we were treated to another fog, not quite so bad as on the previous two nights, but bad enough to make the attracting power of the light a failure. Next evening fog thicker than ever! With four nights' fog, one following the other, it appeared as if the reason why one does not hear so much about the "broad" collecting as the fen is that the handicap with the elements is so much greater. My friend had made up his mind to go back to town on Sunday night, and thus the evening programmes were finished as far as he was concerned. But Sunday morning made the temptation to stay another night too strong. The sky was as heavy as lead, and although later in the day the sun got out it was not for long. In the interval that it did, for want of something better to do, I bicycled into Norwich and inspected the once more famous city. For a place of its size I know of none more hidden, lying as it does in a veritable pit. Six o'clock saw me back preparing for a great night. We moved off with every box we possessed. The picture of the fen at dusk had quite a different appearance. Crambids were flying in multitudes, and included *Crambus perlellus*, *C. culmellus*, *C. uliginosellus*, which were later joined by *Schoenobius gigantellus*, *S. forficellus*, *S. mucronellus*, and *Chilo phragmitellus*. *Lithosia muscerda* was then taken, and three more *L. brevilinea*. By this time it was time to light the lamp. There was not the suspicion of a fog of any sort, and the light looked like a

miniature Eddystone in the fen, so pitch black was the night. The first thing to do, if possible, was to secure a series each of *L. brevilinea*. On taking a division each man finally had ten examples of this intensely interesting insect. Barrett's remarks about this insect are interesting, but his conclusions are surely romantic! After giving the records of capture of the insect, dating only from 1864 (the following year it was described for the first time), he concludes that as in the year 1857 not a single specimen was taken, while all the other now known species were secured, that a *novelty* was introduced about that time to the world's fauna! Speaking about the collecting of Mr. Winter at Ranworth, he says:—"There is no reason to suppose that he employed a light stronger than a lantern, but he could not have failed to obtain it in its rather conspicuous flight at dusk had it been there." In this we are disposed to agree, as if he did not take it at dusk it would most probably have come to the lantern. Then, in 1864, Fenn took the original type specimen. For five years following it was not seen and then afterwards only in small numbers. Barrett, continuing, says:—"In the meantime, a slight migration had apparently taken place across the North Sea, and a specimen was taken in Belgium . . . or it may have been confined to some more remote spot in Norfolk, if such a notion is credible. But to my mind it is a very suggestive piece of history, and by no means confirmatory of modern theories." Here, after Mr. Barrett has very probably explained the "genesis," as he calls it, of the species in Britain, he goes out of his way to arrive at some other conclusion. What the suggestive piece of history is I should like to know, beyond what the author has already related? And how also does it not confirm modern theories? Why could not the insect have been excessively local and scarce originally and then to have gradually spread over the neighbouring country? What is to be said about *Meliana flammea* and *Nascia ciliaris* in Wicken fen? These at one time were so rare that almost any price was offered for specimens. From the opposite point of view one might point out that *Laelia coenosa* and *Callimorpha dominula*, once abundant, are now totally absent from the fen. There are certain insects that fluctuate in numbers to an enormous extent, the reasons for which we cannot satisfactorily state. Why, therefore, could not *Leucania brevilinea* have been once exceedingly rare and confined in its area of distribution? As such, 40 years ago, with imperfect facilities for travel, it could quite easily remain undetected. Many insects discovered even more recently have turned out to be not at all rare in certain small areas. Such has been the case with *Procris globulariae* and, much more recently, *Plusia chryson*, *Acidalia immorata*, and *A. humiliata*. That at the present time *L. brevilinea* should be thought to be wholly British does not prove that it originated in Britain. On the contrary, the specimen recorded from Belgium rather disproves it, and in Holland, where pieces of fen-land are scattered all over the country, the insect is quite likely to be detected some day. As for the evidence not being "confirmatory of modern theories," there seems, to my view, no ground for supposing it to weaken them, if by modern theories Mr. Barrett means the "natural selection" and "environment" theories as being probable factors in producing new species. The *Leucania* under discussion is only new to our limited (that is, since 1864) knowledge, and although the insect belongs to a specialised group of the Noctuids,

and is itself rather specialised in its economy, there is no knowing how old it is, and any idea as to a recent creation must be, to say the least of it, fanciful. I have digressed considerably on *L. brevilinea*, but as so little is generally known of the species I have not restrained from offering a few remarks. By 10.30 p.m. the flight of the insect would appear to be over. Not one was noticed after that hour, but we were not exactly disgusted at *Nonagria neurica* taking its place. Only three specimens of this scarce species turned up. One of my two specimens is considerably darker than the other, but is evidently not the var. *rosea*, Tutt. From *British Noctuae and their Varieties*, I make out that all three specimens must be referred to var. *arundineta*, Schmidt although from the slender character of the abdomen they might have been the type form—*neurica*. *Lithosia muscerda* allowed us a short series apiece. Besides this local footman the more common *L. griseola* was plentiful. The ab. *stramineola* was certainly equally common with the type, thus bearing out the general notion that the ab. is plentiful enough in the broads, if uncommon elsewhere. It was, however, far from rare in Wicken fen this year. *Arsiloneche venosa* and *Calamia phragmitidis* were uncommon, the former being represented by a single specimen only. *Phibalapteryx vittata* was in beautiful condition, and some fine forms were taken from the sheet. To vary the work a bit Mr. James went off into the fen with a hand lantern and netted some nice *Hypenodes costaestrigalis*, which operation I later indulged in and also found three or four larvæ feeding on scabious. What they are time will now, I hope, be able to show, as, next day, they pupated, thus making further diagnosis impossible. *Cataclysta lemnata*, *Paraponyx stratiotata*, *Tapinostola fulva*, *Acidalia emarginata*, *A. immutata*, *Epione apiciaria*, *Nudaria senex*, *Rivula sericealis*, *Leioptilus microdactylus*, *Celaena havorthii*, and *Scoparia pallida* in swarms helped to swell the list of captures, and we returned home with all the contempt for the broads thoroughly dissipated.

Gradual formation of pigment on the dark pupa of *Papilio machaon*.

By FREDERIC MERRIFIELD, F.E.S.

On the 24th of September a larva of *P. machaon*, attached to a dark stick, pupated between 7.30 and 8.30 a.m. At the last-named time it was far from having attained the true pupal form, and I should think it had then emerged not more than half an hour. When I saw it the pupa was wholly green, except the anal segment, which was nearly all dark, the next anterior segment, which had dorsally a little blackish pigment, and the posterior thoracic and the 1st abdominal segments, each of which had subdorsally a little of this pigment; except also that there was a very small patch of similar pigment on the sides of the 2nd and 3rd abdominal segments just above the wings. All these patches were composed of minute spots running into fine lines along the creases of this rough pupa, and spreading beyond by means of minute dark dots. About 9.30 a slight discoloration of another kind came on; this seemed to be deeper seated and appeared in broad interrupted subdorsal longitudinal bands, and similar lateral bands, in both cases embracing the area of the blackish pigment spots which first appeared. The other parts of the abdomen began also to change from green to a more opaque bone colour, apparently also proceeding from a deep-

seated source. About 10.0 the middle portion of the median nervure of the wing, with the three principal nervures branching from it, and, soon after, the subcostal nervure and its fork, began to show themselves as of a darker green than the rest of the wing; soon afterwards the head and coverings of the eyes, mouth-parts, antennæ, and legs began to darken; also parts—chiefly the rough prominences on the back—of the thorax. By 11.0 dark pigment commenced to appear in these thoracic dorsal regions and on the nervures and nervules above referred to, also about the head, especially on its dorsal aspect. At this time the ground colour of the pupa in the parts not darkened had become dull yellowish bone colour on the abdomen and back of the thorax, greenish dusk on the wing cases and on all the rest of the pupa. By 1.0 p.m. the dark parts had become much darker, but the light parts still preserved a slight greenish tinge. By 7.30 p.m. the dark parts had spread considerably, so that much the greater part of the pupa had become suffused, including the head, all the limbs, the whole of the wings except a central portion not representing more than half the area of the forewing, except also the ventral portion of the abdominal region, and a broad longitudinal band on each side of the dark subdorsal bands, which had now almost united into one, these lighter bands being continued, in a somewhat darkened hue, along the thorax; all the light parts were more or less darkened, and had lost every trace of the greenish. The dark parts had become much more intense in hue, the head especially and the anterior portions of its appendages and those of the thorax being blackish, shining where the light fell, so as to give them in parts almost the appearance of having been plastered with tar.

About 2.25 p.m. I observed another pupating larva, of which the larval skin had just begun to split over the thorax. I watched it until the whole of the larval skin had been cast off, and noticed that all the parts which were dark in the pupa first described at 8.30, were dark at the moment of their first appearance through the split skin. This second pupa had small blackish spots in the subdorsal region, not only on the 1st and 2nd abdominal segments, but on most of the others. By 4.0 p.m. there was still no darkening except on the abdomen. By 7.0 p.m., when I again examined it, the nervures of the wings had become blackish and the head had darkened. By the next morning the pupa had attained its full darkness, or nearly so, very nearly resembling the first pupa.

I watched several other dark pupæ in different stages after the casting of the larval skin, but was not able to do so continuously, sufficiently, however, to show that the detailed description above given is of general application.

It would appear from the foregoing observations that when a pupa of *P. machaon* is going to be dark coloured (a destination fixed in the period of larval existence when feeding has ceased, as so fully investigated and ascertained by Professor Poulton) very small portions are darkened while the pupa is still clothed with the larval skin; that after this there is very little change in colour for nearly two hours, and that afterwards the abdomen colours before the anterior part of the pupa. It should be understood that the temperature during the whole period of observation ranged from about 60° to 64°; one of 80° would doubtless have much accelerated the changes. I have always found it

necessary, in order to form an idea of the relative time occupied by different stages in active metamorphosis, to note the temperature. In cooling experiments, where the temperature is low down among the forties, four weeks are equivalent in physiological progress, to not more than two or three days of a forcing temperature of 80° (see *Trans. Ent. Soc. Lond.*, 1891, p. 161).

The pupæ of the eight larvæ of *P. machaon* that attached themselves for pupation to green stems of growing plants have no dark pigmentation whatever, and are scarcely changed from the green which appeared at the moment when the larval skin was cast off. The colour only seems to become of a brighter hue, both on the green parts and on the yellowish dorsal region.

Some notes on *Acidalia emarginata* and its sexual dimorphism.

By W. S. RIDING, B.A., M.D., F.E.S.

I have recently reared a small brood of *Acidalia emarginata*, and find the imagines are conspicuously sexually dimorphic in both colour and shape.

The colour of the ♂ is pale ochreous-yellow, and the lines and spots are reddish-brown, the latter very dark. Some reddish-brown scales (only distinctly seen under the microscope) are sparingly scattered near to and outside the 1st line, and also between the 2nd and hind-marginal lines. These scales occasionally produce a faint blush. The colour of the ♀ is pale ochreous-yellow on the costa, and as far as the upper median nervure, but the rest of the wing is reddish-brown. This is owing to a great increase of the scattered scales above described, and some of these more closely massed form a dark median shade, almost blackish, outside and adjacent to the 1st line, and extending from the dorsal to the discal spot where it ceases. The lines and spots are similar to those of the ♂.

The scallops on the margins of the wings are much more concave in the ♀, and give a different contour to both wings, which become truncatedly angular, as though they belonged to a different species. The apex of the fore-wings is consequently more produced, and the marginal extensions between nervures three and four appear much more developed on both wings (especially the hind). The colour of the ♀, though best described as reddish-brown, has a very distinct pinkish hue when viewed by oblique light.

The head, thorax, and abdomen are pale ochreous-yellow in both sexes; the antennæ ciliated in the ♂ but not in the ♀ (Newman calls them erroneously "nearly simple in both sexes"). There is little difference in size, as some specimens of both sexes are equally large (20-22mm.), but one of my ♀s ran as small as 18mm., and so the average of the latter is reduced. Newman's description and correct drawing are evidently taken from a ♂, and no reference is made by him to the ♀; Stainton's description, on the other hand, is that of a ♀, but his figuring is valueless, though presumably of that sex. Meyrick seems to describe from both sexes, but scarcely to recognise the sexual differences as he writes of the median shade of both, as "a line (*sic*) broad, fuscous, sometimes faint." In my specimens of the ♂ this is never more than a faint blush on the forewing, in a few a little more marked on the hindwing, and in some indiscernible on both. The

larvæ appear to thrive on the withered leaves as well as the fresh ones of convolvulus. They have a great protective resemblance to the curved withered stems of their food-plant, and there is much difficulty in finding them amongst the dried *débris*, but, as noticed by my friend Mr. Onslow, who kindly sent me the larvæ from Wimbledon, on breathing over the mass, it at once wakes into life, and motion takes the place of apparent death. The pupal stage is a very short one, and early in July I had some of the brood in all three stages on the same day.

The ♀ scatters her ova, and in the present instance laid between 30 and 40. The ova are somewhat irregularly oval (irregularity due to pressure, on or during deposition). Length .28mm. to .297mm. Breadth .198mm. to .231mm. The surface is reticulated in regular hexagons. Colour very pale reddish-brown, becoming darker in the centre and round the edge, and in a few days almost black, when the ova hatch. About half of mine hatched within a week, but the rest have not developed further than the second stage, and are probably addled.

COLEOPTERA.

Cercyon bifenestratus, Kust. (= *palustris*, Thoms.).—An addition to the British list.

By E. A. NEWBERRY.

This insect, although placed in another sub-genus by Kuwert (*Fauna Baltica*, 1890, p. 112), is so closely allied to *marinus*, Thoms., that it has hitherto escaped observation in Britain. Bedel [*Col. B. de la Seine*, i., p. 338 (1881)] separates it from *marinus*, thus :

Mesosternum narrow. Body more oval. Apical spot of the elytra more reduced inwardly, but mounting laterally up to near the shoulders—

marinus, Thoms. (*aquaticus* of Brit. colls.).

Mesosternum oval. Body more thickset. Apical spot larger inwardly, but only mounting externally up to the level of the metasternum—

bifenestratus, Kust. (*palustris*, Thoms.).

Thomson (*Scand. Col.*, ii., p. 105), in describing *C. marinus*, says "macula apicali epipleurisque livido-testaceis. . . . Mesosterno lanceolato-lineari." He contrasts *palustris* with it as follows: "Precedente proximus, statura brevior, elytrorum macula apicali altius adscendente, mesosterno latiore, ovali, palpis pedibusque obscuribus." Kuster's description is by no means so characteristic, though much longer (*vide* Kust., *Kaf. Eur.*, 23, 15 [1851]).

C. marinus, Thoms. (*loc. cit.*), *aquaticus* v. β. Muls. *nee* Steph., is found widely distributed in Britain, and is common in the London district, on the muddy banks of streams. The name *aquaticus*, Steph., cannot be retained, since his descriptions in the *Illustrations* and *Manual* evidently refer to *analis*, Pk. Two out of the four examples in his collection are *analis*, and the other two are bad specimens, difficult to determine, but certainly neither *marinus*, Thoms., nor *bifenestratus*, Kust. Mulsant's description of *aquaticus* probably includes both the above species, at all events, Bedel and Kuwert are of this opinion.

C. bifenestratus, Kust. (*loc. cit.*), *palustris*, Thoms., *aquaticus* (*pars.*), Muls., appears to be a scarce insect, though it is not improbably mixed with the allied species in British collections, I have only seen

the specimens taken by myself in July, 1896, in the broad ditch near Sandown Castle, Deal.

I must confess that the only character which appears to me to be constant is that of the shape of the mesosternum. M. Bedel very kindly corroborated the specimens I took to him, doing so from the upper side alone, and an examination of the mesosternum fully bears out his diagnosis. I have, however, a specimen of *bifenestratus*, Kust., received from Reitter in which the margins of both thorax and elytra are entirely red-yellow. Some specimens in Dr. Power's collection are very similar, but being carded the mesosternum is not visible, and they are probably to be referred to *marinus*, Thoms.

DESCRIPTION OF THE LARVA OF *QUEDIUS KRAATZII*, BRIS.—I found the larva of *Quedius kraatzii* at Chiddingfold this year, and have been also successful in taking the perfect insect near the original locality. Both larvæ and perfect insects were fairly numerous. The former lives in the mud of the small reaches that stretch into the stream, and may be induced to emerge by "sluicing." It runs very fast and bears a very strong resemblance to the perfect insect. I was several times under the impression that it was the latter till I had picked it up. The following is a description of it:

Larva: Head and prothorax horny. Head of a yellowish-red, prothorax dark ruby-red. Mesothorax and metathorax of a less horny consistency, same colour as prothorax. Abdomen soft, of a dirty blackish-brown colour above, grey beneath. Legs and antennæ yellow. Head subquadrate, flat, smooth. Antennæ four-jointed, the basal joints being the longest; third joint curved, and with a very small joint, or appendage, on its outer side near apex; last joint small. Mandibles strong, curved, and furnished with a large tooth in middle of inner side. Labrum transverse. Labium small. Labial palpi two-jointed, second joint very short and pointed. Maxillæ cylindrical. Maxillary palpi two-jointed, second short and pointed. Prothorax transverse, about as broad as head. Mesothorax and metathorax transverse, a little less broad than prothorax. Abdomen nine-jointed, segments of about equal length, but getting gradually narrower to apex; the terminal segment furnished with two long cerci, which are two-jointed, and furnished with numerous simple setæ. Anal appendage elongate and horny, used to assist progression. Legs three-jointed. Length 6mm.

—H. DONISTHORPE, F.Z.S., F.E.S., Deurandesthorpe, Chiddingfold, Surrey.

QUEDIUS MESOMELINUS, MARSH, A MYRMECOPHILOUS INSECT.—Having discovered an old oak stump at Chiddingfold in which a colony of *Lasius fuliginosus* has its home I have been working it for myrmecophilous coleoptera. So far the following three species have turned up:—*Myrmedonia lugens*, *M. funesta*, and *Quedius mesomelinus*, the last species in some numbers. This beetle has not, I believe, been recorded as occurring with ants before, nor does Wasmann mention it in his "Myrmekophilen und Termitophilen Arthropoden." The ants enter the stump by a hole large enough to admit one's hand. There is no doubt that the *Quedius* is living in the nest of the ant, and as *Q. microps* sometimes occurs with this ant (Was., *Myr. u. Ter. Art.*, p. 84) and *Q. brevis* is only found with ants (both this ant and *Formica rufa*) it is not surprising that *Q. mesomelinus* should also sometimes occur with these.—*IBID.*

NOTES ON SOME ABERRATIONS OF *OSPHYA BIPUNCTATA*, FAB.—Being fortunate enough to take this fine insect recently, in the Midlands, in some numbers, I noticed several interesting forms, which, as far as I can ascertain, have not been described or recorded before. The insect

is found on the whitethorn blossom, and clings rather strongly to the bloom, requiring powerful beating to dislodge it. In bright sunshine it takes to wing very readily.

Osphya bipunctata, Fab., "Syst. Ent.," p. 206 (1775); Muls., "Col. Fr.," p. 109 (1856); Fowler, "Col. Brit.," v., p. 49 (1891). *Anceps*, Stephs., "Man.," p. 339 (1839). ♂ *Claripes*, Ol., "Enc.," 8, 385 (1811). *Bimaculata*, Stephs., "Illus. Brit. Ent.," v., p. 59 (1832). ♀ *Praeusta*, Ol., "Enc.," 8, 385 (1811). TYPE.—♂ Elytra greyish-black, sometimes yellowish-red at the margins, posterior femora strongly thickened.*

a. ab. *maculata*, n. ab.—Elytra grey-black, apical half red-brown, margins red-brown. [The general appearance of the coloration is exceedingly like the brown and black form of *Toxotus meridianus*].

TYPE.—♀ Thorax red with two black spots varying in size, elytra brownish-red, apex black, posterior femora simple.

β. ab. *impunctata*, n. ab.—Thorax without spots, apex of elytra only just black. [Mr. Donisthorpe has captured specimens intermediate between this and the type, the spots being only just visible.]

γ. ab. *4-punctata*, n. ab.—Elytra with two small black humeral spots, in addition to the two on the thorax, the margins of anterior angles of elytra black; apex also black.

In addition to these forms the size of the spots varies considerably, as does the apical black marking of the elytra.—FRANK BOUSKELL, F.E.S., F.R.H.S., Market Bosworth, Nuneaton.

* I am informed by Mr. Donisthorpe that he has taken, in Huntingdonshire, a form of the male with the femora quite simple.

ORTHOPTERA.

FLIGHTS OF LOCUSTS IN NATAL.—I am much interested in the series of articles on "The Migration and Dispersal of Insects," now being published in the *Ent. Record*. We had some large locust flights here last December, one of which lasted from 7 a.m. to 4 p.m. There was very little wind at the time they were flying. They passed in a northerly direction, and the flight appeared to be of great extent, though not dense. Some of the insects were so high that one could hardly discern them, whilst others flew through the streets, striking against people and houses as they passed. The whole black population turned out striking pails and tins or anything to make a noise. They did not appear to have alighted until Zululand was reached, but the exact place has escaped me.—E. M. CHEESMAN, care of John Garson, 63, Railway Street, Durban, Natal. August 10th, 1899.

ORTHOPTERA AT THE WARREN, FOLKESTONE.—During a stay at Dover I took the opportunity of visiting the Folkestone Warren, where so many of our more local Orthoptera are found. My chief object was to take some more specimens of *Forficula lesnei*, Finot, which I had taken there first in 1896. Steady sweeping for some time produced no result, until at one corner I found four examples at once in the net. I took a few more, but had little time to spare for further search. I took no species that had not been before captured at the Warren, but found *Gomphoceris rufus*, L., in some numbers. This local species had been very numerous in 1896, but not a specimen was to be seen in the

following year. In France I have taken it chiefly in woods, among the undergrowth, but in England only on grassy hillsides. Other Orthoptera there were *Stenobothrus lineatus*, Panz., *S. bicolor*, Chp., *S. parallelus*, Zett., *Thamnotrizon cinereus*, L., and *Platyclus griseus*, Fabr. I am not aware that either *Leptophyes punctatissima*, Bosc., or *Meconema varium* has been observed in the locality, but that is probably due to neglect. They are by no means rarities, and have probably been overlooked. In the handbook to the neighbourhood of Dover issued for the members of the British Association, in the entomological part, no mention is made of Orthoptera, which is a pity. Nearly all our most interesting species occur in the neighbourhood. In addition to those mentioned above *Tettix bipunctatus*, L., and *Locusta viridissima*, L., are common all along the coast. *Ectobia panzeri*, Steph., and *Stenobothrus elegans*, Charp., both very local species, are numerous on the sandhills at Deal, and *Decticus verrucivorus*, L., second only to *L. viridissima* in size, and one of our rarest species, has been taken on two separate occasions on the cliffs at St. Margaret's Bay.—MALCOLM BURR, F.Z.S., F.E.S. *September 17th, 1899.*

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

EGGS OF ZONOSOMA (EPHYRA) PUPILLARIA VAR. GYRARIA.—Pale yellowish when first laid, changing to bright orange in three or four days, and strongly spotted with crimson a day or two later. The eggs laid on glass were all placed in true Geometrid fashion and single; those on side of box were in little heaps of four and five, and mostly on narrow end. The egg is somewhat oval in outline, broader at the micropylar end than at its nadir, without the ordinary depression on the upper surface. Length, breadth, height :: 2 : 1 : 1. The shell is covered with a polygonal (? chiefly hexagonal) network, distinctly visible under a two-thirds lens used as a hand-glass. The reticulation appears to be more marked on the shoulder of the egg surrounding the micropyle, and the structure of the latter not discoverable with power at disposal. [The eggs were laid from April 14th-20th, 1898, by a ♀ taken at Cannes, and described April 21st. It may be well if someone who has the opportunity will compare this with the egg of *Zonosoma punctaria*, since Millière, *Icon.*, ii., pp. 288-290, suggests that *Z. pupillaria* may be a southern variety of this species, noticing that the larva of *Z. punctaria*, which is common everywhere in oakwoods except in Provence, resembles so much the larva of *Z. pupillaria* that one is not able to distinguish them even when one has them alive side by side.]

ACHERONTIA ATROPOS LARVÆ FEEDING ON PRIVET.—I have recently had several larvæ of *Acherontia atropos*, one of them the brown variety. They were found on a privet hedge, and they eat privet voraciously. They have a very curious horn.—GEORGE B. ROUTLEDGE, F.E.S., Tarn Lodge, Headsnook, Carlisle. *September 19th, 1899.*

FOODPLANTS OF CIDADIA PICATA.—I find that this species will readily eat some other *Caryophyllaceæ* besides the common chickweed (*Stellaria media*), namely, *S. aquatica*, *S. holostea*, *S. graminea*, *Cerastium glomeratum*, and, I believe, *Stellaria uliginosa*. My larvæ also nibbled the leaves of the common red campion (*Lychnis dioica*), but did not seem to relish it. I strongly suspect that the Rev. P. H. Jennings's indication of *Galium mollugo* as a foodplant (*Entom.*, ix., 13) is erroneous.—LOUIS B. PROUT.

VARIATION.

PARALLEL VARIATION IN LARVA AND PUPA.—Has anyone when breeding *Ennomos fuscantaria* noticed that the brown larva changes to a brown pupa, and the green larva to an apple-green pupa? I have not hitherto noticed this although I have bred this species repeatedly from ova?—S. WALKER, Eddercliffe, Queen Anne's Road, York. *September 25th*, 1899.

ABERRATION OF *BOARMIA GEMMARIA* (*RHOMBODARIA*).—A brief account of a melanic aberration of *Boarmia rhomboidaria* I have bred may be of interest:—Fore- and hindwings and antennæ of the colour of the lines in typical specimens, with first and subterminal lines ochreous, thorax and extreme base of forewings as in type; body and legs same colour as wings, with ochreous markings at segments and joints. Eight of these aberrations were bred in a brood of seventeen moths. The parent was taken at Bexley on August 12th, 1898, and when fresh was no doubt similar to her progeny, but at the time of capture she was much worn and I had not the slightest notion what species I had secured. There seems to be an idea prevailing that aberrations appear at the end of an emergence, but as it did not hold good in this case I append the dates on which the two forms came out:—*Typical*.—June 28th (1), 30th (1), July 3rd (1), 5th (1), 8th (1), 9th (2), 10th (2). *Aberrations*.—June 29th (1), 30th (1), July 1st (1), 4th (1), 5th (1), 7th (1), 12th (1).—B. A. BOWER, F.E.S., Eltham Road, Lee. *August 10th*, 1899.

DARK ABERRATIONS OF *HEMEROPHILA ABRUPTARIA*.—The dark aberrations of *H. abruptaria* have been exceedingly rare in their usual locality this year. I know of only two captures—one, a female, by Mr. Pearce in his garden, another, a male, taken just off the Camden Road, Holloway.—W. A. SOUTHEY, 51, Crossley Street, Liverpool Road, N. *September 3rd*, 1899.

EREBIA AETHIOPS AB. OBSOLETA.—Among a number of specimens of *E. aethiops* captured about thirty miles from here, I obtained a fine male *E. aethiops*, which is practically ab. *obsoleta* on the hindwings, and on the forewings has only the faintest tinge of fulvous round the apical spot.—H. MOUSLEY, F.E.S., 10, Selborne Terrace, Bradford. *September 2nd*, 1899.

SMALL ABERRATION OF *EUCHLOË CARDAMINES*.—On June 17th I captured a very small specimen of *Euchloë cardamines*, in Bucks. It measures only 33mm.—A. M. SWAIN, 5, Kelvin Terrace, Sydenham, S.E.

SCIENTIFIC NOTES.

HYBRID *CLOSTERA CURTULA* × *RECLUSA*.—With regard to my note on the cross of *C. curtula* × *reclusa* (*ante*, p. 239) I have to state that I have had eight imagines out during the last few days, and they are rather like *C. curtula*, only much darker. I find I made a slight error in saying the colour of the ova was "brown like *C. curtula*," I should have said "brown like *C. reclusa*." Of course that of *C. curtula* is dark green, not brown.—L. W. NEWMAN, 41, Salisbury Road, Bexley. *September 18th*, 1899.

CROSS-PAIRING OF *ANTHROCERA LONICERAE* AND *A. FILIPENDULAE*.—During July I found *Anthrocera lonicerae* very abundant in a locality

near here, and with them was a fair number of *A. filipendulae*, the latter, however, not nearly so common as the former. Looking over those *in copulâ*, I found five pairs that were crossed, i.e., *A. loniceræ* paired with *A. filipendulae*, three of which laid good batches of fertile ova, which hatched in due course. Mr. W. H. B. Fletcher then kindly took charge of them and I have no doubt will have some interesting notes later on if he be successful in rearing them.—A. H. HAMM, 52, St. Mary's Road, Oxford. *September 26th*, 1899.

PRactical HINTS.

MEANS OF PREVENTING ANTS ATTACKING DRYING-HOUSE IN SUB-TROPICAL COUNTRIES.—An unfortunate accident with the first batch of insects set and consigned to the drying-house here, owing to ants, has led me to adopt new measures perhaps worth relating. The drying-house containing this first lot was suspended from the ceiling, in order to keep it from the ravages of a small brown ant that abounds here. After it had been suspended three days I examined it, and found a stream of ants ascending and another descending, carrying large pieces of legs, wings, &c. The descending stream being followed was found to pass out of the door into the verandah, where they disappeared into a hole (which is now plugged up). On taking the setting-house down I found thousands of ants within (very few of which escaped alive), and all my nicely set insects ruined, not a perfect specimen being left. I daresay from one point of view, it was very interesting, for one suspects that one or two ants must have discovered the insects, and then communicated the locale of their find to the others, but this is little compensation for the disappointment one feels at so great a loss. I have now adopted the following plan: Obtain a bottle, tie a piece of string around it where you wish it to break, soak the string in paraffin, and set it on fire. When the string has burnt out plunge the bottle into cold water, when it will break where the string was tied. Cork the bottle-neck, run a piece of wire through the cork, bending each end of the wire into the form of a hook. Turn the bottle neck downwards, hook on the setting-house, tie a cord to the other end of the wire and suspend from an eye in the ceiling; half fill the open part of bottle with water, and the apparatus for preventing the entry of ants is complete.—E. M. Cheesman, 68, Railway Street, Durban, Natal. *August 10th*, 1899.

Field Work for October.

By B. A. BOWER, F.E.S.

1.—Larvæ of *Stilpnonota roseticolana* may now be found in the fruit of various species of wild roses. They betray their presence by discolouring the hips. Place virgin cork amongst the hips for the larvæ to spin up in, and as soon as they have done so put the cork out of doors, as pupation does not take place until late in the spring.

2.—After dark *Thera juniperata* is often to be found in great numbers resting on juniper bushes.

3.—*Xylopada pariana*, in sunny weather, sometimes occurs freely on flowers of various *Compositæ*; it also frequents thatch.

4.—The following Coleophorid larvæ should be searched for:—*limosipennella* and *wilkinsonella*, on birch; *paripennella* on bramble,

rose, sloe, &c.; *fuscocuprella* on hazel; *argentula* on *Achillea millefolium*; *potentillæ* on bramble, *Potentilla tormentilla*, *Spiraea filipendula*, *Poterium sanguisorba*, &c.; *badiipennella* on elm.

5.—In some localities the mines of *Lithocolletis comparella* are common in leaves of many species of *Populus*, but prefer the garden one with white undersides to its leaves. The moths emerge at once.

6.—Larvæ of *Lithocolletis riminetorum* should be sought for in mines at the edges of leaves of *Salix riminalis*.

7.—*Peronea tristana* and *ferrugana* are to be beaten from their food-plants (*Viburnum lantana* and birch). Both are very variable, so should be carefully examined.

8.—Mines of *Nepticula catharticella* often occur in great quantities in leaves of *Rhamnus catharticus*, but are difficult to see until one's eye becomes accustomed to them.

9.—Larvæ of *Nepticula myrtillella* are sometimes common in moorland districts in leaves of *Vaccinium myrtillus*.

10.—Mines of *Lithocolletis stettinella*, *Nepticula alnetella* and *glutinosa* occur in alder leaves. The larvæ of the *Lithocolletids* are partial to the small leaves at the ends of twigs.

11.—*Eupithecia campanulata* larvæ feed on the seeds of *Campanula trachelium*, and may also be found in gardens on cultivated varieties of Canterbury bells.

12.—Larvæ of *Cochylis smeathmanniana* are now about fullfed, and are to be found in seed-heads of *Achillea millefolium*, connecting the seed-vessels with a silken gallery.

By J. W. TUTT, F.E.S.

13.—During October the spun-together leaves of birch should be collected for pupæ of *Drepana falcata*; similarly fastened together leaves of beech will give pupæ of *D. unguicula*.

14.—The roots of old poplars are always a prolific hunting ground for the collector of pupæ. One of the best finds is *Cymatophora ocularis*.

15.—At the roots of oaks one not only finds large numbers of common Tæniocampid and other pupæ, but those of *Cymatophora ridens*, and other rarer insects are also to be taken—*Notodonta dodonaea*, *N. chaonia*, &c.

16.—The spun up leaves of poplars should be searched for the fullfed and pupating larvæ of *Clostera curtula*.

17.—The imagines of *Dasyampa rubiginea* are to be taken at sugar and on ivy blossom in October and November. They hibernate and occur again at willows and at sugar in the spring.

18.—The imago of *Himera pennaria* flies at dusk in October and November (comes also very freely to light). Many may be sometimes found at rest on the bare twigs of bushes afterwards, and at rest they resemble very closely dead leaves.

19.—In October beating for larvæ by night often pays better than beating by day. *Cymatophora fluctuosa*, *Drepana falcata*, and many other birch feeders hide in spun leaves by day, but fall readily into the beating-tray at night.

20.—The seed-heads of golden-rod should be collected in October, and kept out of doors during the winter. In spring they should be put under cover, and in this way it is possible to breed *Eupocilia subroseana* freely in May and June.

21.—The cocoons of *Stigmonota regiana* are to be obtained during autumn and winter under the bark of old sycamore trees; the larva appears to remain in its cocoon unchanged until spring.

N.B.—For similar series of Practical Hints for this period of October see vols. x., pp. 250-252, ix., pp. 264-5, viii., pp. 194-5, 241, &c.

NOTES ON COLLECTING, Etc.

NOTES ON COLLECTING IN THE ISLE OF MAN.—The entomological season of 1899 has been a most successful one here. Insects have been numerous, and some good captures have been made. As regards rare species *Deilephila livornica* stands decidedly first. Several specimens of this beautiful moth having been seen and captured during May along the coast, near Douglas Head, as stated by me (*ante*, pp. 166 and 194). During the latter part of May and early June the great feature was the astonishing numbers of *Macroglossa stellatarum*, which appeared in various parts of the island (a good many freshly-emerged specimens have recently been seen by me [between the 5th and 11th inst.] about midday, hovering over the flowers of lobelia. Are these a second brood from those which appeared in May?). Between 21st of May and 6th June, *Choerocampa porcellus* and *C. elpenor* were plentiful at flowers of red valerian and white pinks. The latter insect also came freely to the trees which I sugared during the early part of the evening, and examples were easily netted whilst hovering in front of the sweets. *Dianthoeicia capsophila* and *D. caesia* were on the wing unusually early, namely, May 8th, which seems strange, considering the cold winds experienced for some time previous to that date, and which retarded vegetation so much. In ordinary seasons June 1st may generally be regarded as the proper date on which to take *D. caesia* in good condition, at least this has been my experience. The dealers who visited the island this year reaped, I am told, a rich harvest in this species, aided by local talent. *S. philanthiformis* larvæ were to be taken freely from thrift all through May, and during June and July Noctuids swarmed at sugar, and light proved very attractive. *Cirrhoedia veranpelina* appeared very early in August. A good many specimens were taken by me previous to August 10th. In former years I scarcely ever took the insect before the 20th, and found emergences taking place daily up to September 3rd. *Pyrameis atalanta* has been very numerous all through August, the insect coming to sugar in great numbers during the afternoon. A fine specimen of a locust, which Mr. Malcolm Burr, of Dormans Park, East Grinstead, kindly identified for me as being *Pachytylus danicus*, L., was captured alive on the Calf of Man by Mr. Cary, on August 30th. Some ivy bloom in front of this house is now attracting many of the commoner autumnal Noctuids, but the cold and high winds of the past week have been adverse to collecting. I am sorry to say that I have had no opportunity of getting to the rocks this year for *Polia (xanthomista)* var. *nigrocincta*, and am, therefore, unable to say whether the insect is out in any numbers or not.—H. SHORTRIDGE CLARKE, F.E.S., Sulby Parsonage, Isle of Man. September 23rd, 1899.

COLLECTING LEPIDOPTERA IN 1899.—I have worked pretty regularly and hard this summer, but the result has been very disappointing,

with the exception of *Triphaena pronuba* and *Xylophasia monoglypha* no species has been really abundant this year so far; and the weather has, as a rule, been very unfavourable for night work, a large amount of east wind, clear sky, and ground fog having rendered many nights blank as far as our common is concerned. After the thundery weather at the end of June sugar proved attractive for most of July, *T. pronuba* and *X. monoglypha* being perfect pests; and many other common species turning up, but the only things of any note were a couple of *Mamestra abjecta*. *Dyschorista suspecta* was more plentiful than usual with us, and I got three specimens of *Agrotis restigialis* which seems an unlikely sort of species to get so far from the coast. At the end of June I had the inside of a week (my only holiday this year) at Chatham. While there I had an afternoon at Chattenden with Mr. J. J. Walker, but was grievously disappointed. Very few lepidopterous insects of any sort were about, and the only species worth boxing were *Acrolepia aeneana* (1), *Acilalia trigeminata* (1), *Eucosmia undulata* (1) and a few *Gelechia ligulella*. At Chatham itself I got *Eupithecia scabiosata* and *E. absynthiata*, whilst *Myelois cribrella* was abundant on thistles, and *Catoptria fulvana* was also common. I had one day at Cuxton, but alas! the wind blew a gale and it was impossible to use a net. I obtained *Dasyceira olivierella*, and that was about all. In the capsules of *Silene inflata*, I got some newly hatched larvæ which proved to be *Dianthoeia cucubali* and one of these produced an imago on August 3rd. Is this usual? The remainder are apparently lying over as pupæ. With regard to the present month, I had one good night on the West Yorkshire moors after *H. sordidata* and got some good forms; but sugar has been quite useless, owing, I suppose, to the persistent east wind. During the past week I have been working very hard for *Cirrhoedia verampelina* and *Agrotis agathina*. The former has been rather more plentiful than last year, but by no means as common as in some seasons, and several cripples have turned up. The weather has been all against *A. agathina*—clear cold nights, with bright moon and east wind, and (about every other night) ground fog has caused the catch to be a very small one, and now we have thunder showers, which will finish them off, I only kept a few larvæ myself but these have turned out fairly well, and would probably have done better, but a mole burrowed under, and into, my best tub, and I expect demolished all the pupæ as not a moth emerged in it. With regard to Psychids I have found old cases of *Taleporia tubulosa* (*pseudobombycella*) on the trees here, but as far as I know this is the only species we have. Larvæ are very backward at present, and apparently scarce.—(Rev.) C. D. ASH, B.A., Skipwith Vicarage, Selby.

LEPIDOPTERA AT OXTON.—Collecting here has been very good during the last month or so. A visit to Sidmouth on July 18th, 1899, produced *Thymelicus actaeon* in plenty, and *Melanargia galathea* in splendid condition. *Callimorpha hera* has been very abundant, though I have hardly worked for it myself. *Zonosoma porata* and *Acidalia emarginata* have been freely beaten from hedges, with occasional *Cidaria picata*. Sugar here has been, as always in summer, a complete failure, but it has paid well on Dawlish Warren, where *Mamestra abjecta*, *Agrotis restigialis*, *A. tritici*, *Hadena dissimilis*, *Miana bicoloria*, etc., have turned up. *Agrotis agathina* again has been a failure I am sorry to say, I cannot tell why for they have been treated exactly the same as in 1897,

when I bred a moth from almost every larva, and fine large specimens. A few are coming out from larvæ kindly sent me from Yorkshire by Mr. Ash, but they are small and poor-looking, as those of last year. Light has paid pretty well lately, one curious feature being the large number (comparatively) of ♀ *Psilura monacha*, taken in the traps. This species is very late this season, being now just in finest condition, *Leiocampa dictaeoides* also turning up, three this week. It may be of interest to note that *Callimorpha hera* is spreading, I saw one in Alphington yesterday and took two close to Exminster. I also saw a ♂ *Colias edusa* in St. Thomas, a suburb of Exeter.—E. F. STUDD, M.A., F.E.S., Oxton, Exeter. August 12th, 1899.

NOTES FROM SOUTH-EAST LONDON.—The following dates may be interesting as coming from the London district: On June 25th I captured *Smerinthus populi* ♂ at Sydenham, on July 11th, ♂ and ♀ of the same species at Dulwich, on July 16th and 18th, other males, and on the 31st another ♀ at Sydenham. The female captured at Dulwich measures 94mm. in expanse, and laid 188 eggs. On June 3rd I captured *S. tiliæ* ♂ at Sydenham, on the 6th a ♀ at Forest Hill, on the 15th a ♂ at Sydenham, on July 8th a ♀ at Dulwich. The latter had laid 39 eggs on the side of some stone steps which were quite five yards from a lime tree. On June 17th, 1897, I captured a male specimen of *S. ocellatus* at Sydenham, but have never seen the species since. On June 23rd, 1899, I captured a specimen of *M. stellatarum* on a fence near rhododendrons, in Sydenham. A female *Urapteryx sambucaria* laid 457 eggs between July 13th and 16th, and one of *Zeuzera pyrina*, captured on the 15th, had laid 223 by the morning of the 18th. *Cyaniris argiolus* were seen in the roads at Sydenham, and two ♂s and one ♀ were captured. On August 14th, about 9 a.m., a male and female *Orygia antiqua* emerged from pupæ, they paired directly after and remained so until about 10 a.m. By the evening 75 eggs had been laid, very few on the 15th and 16th, but by the evening of the 17th, 277 had been deposited, one batch numbering 93 and another 79.—A. M. SWAIN, 5 Kelvin Terrace, Sydenham, S.E.

LEPIDOPTERA IN LANCASHIRE.—The following dates refer to observations made this year:—*Smerinthus populi*, three larvæ taken at Halliwell, near Bolton, on August 22nd, two nearly fullfed, one just about to change its skin (2nd moult) one of the older ones buried itself on August 25th. *Smerinthus ocellatus*—one larva taken on August 21st, at Limbrick, near Chorley, Lancashire, buried itself the following day. This is the first that I have observed in this neighbourhood where the insect appears to be very rare. *Macroglossa stellatarum*—saw a specimen on June 10th, at Halliwell, another at Old Trafford, Manchester, on June 17th, hovering over some blue flowers in a lady's hat. *Trochilium apiforme*—caught the first examples observed in this district between July 12th and 21st.—O. WHITTAKER, Moreland, Heaton, Bolton. August 26th, 1899.

LEPIDOPTERA IN THE BURNLEY DISTRICT IN 1899.—In consequence of a rather cold and wet spring there was very little doing here till the end of May. On May 27th, *Fidonia atomaria* were flying in the sunshine among heather, and a few *Saturnia carpinii* ♂s were also seen. On May 29th, a single *Venusia cambricaria* was found on a trunk at Hardcastle, near Hebden Bridge, Yorkshire; a very early specimen. June 3rd, *Taeniocampa rubricosa* was still flying, but worn, and also *T.*

stabilis, both among heather; while *Hypsipetes impluviata* were just emerging and drying their wings on the alder trunks; *Coremia undentaria*, which is rare here, was also taken. From the 5th to 13th *H. impluviata* was plentiful, but local and mostly of the dark form prevalent here. On the 11th a ♀ *Notodonta dromedarius* was taken which laid some eggs, but these were infertile. A *Smerinthus populi* was found on the garden wall on the 15th, and a visit to the moors on the 17th, produced *F. atomaria*, *Coremia ferrugata*, *Eupithecia vulgata*, and on the rocks three *Hadena glauca*, these were much worn, but one ♀ laid ova which hatched on the 22nd. Nothing was done during the remainder of the month on account of absence from home. Early in July treacling was tried and insects were found to be rather plentiful. The most abundant species was *Miana strigilis* ab. *aethiops*, and next *Noctua augur*, while *Euplexia lucipara*, *Miana fasciuncula* (red and buff forms), *Noctua festiva*, *Hadena thalassina*, *H. adusta* and *H. dentina*, were also taken. July 6th and 12th were the best nights. On July 4th and 6th *Hepialus rullela* and its ab. *gallicus* were seen, but were not abundant, and *Plusia pulchrina* was taken flying over nettles. On the 18th, a few *Tenusia cambricaria* were found on the trunks of the mountain-ash, but were scarce on the whole, as were also *Metrocampa margaritata*, while *Cidaria pyraliata* was not seen. A specimen of *Choerocampa elpenor* was taken by a friend at sugar, and odd specimens of *Noctua brunnea* and *Hadena pisi*, *Larentia pectinitaria*, and *Melanippe galiata*, complete the list for the month. During August business engagements prevented much collecting till the end of the month. *Cidaria populata* were common early in the month on the moors. At treacle the commonest moth was *Miana literosa*. *Tryphaena pronuba* and *Xylophasia polyodon* were of course very common, and there were a few *Noctua baia*. On August 21st, *Charaxes graminis* were found on thistle heads on the moor, and *Polia chi* was plentiful. On the 26th, *P. chi* continued common, and among others the vars. *olivacea* and *suffusa* were found, also intermediate forms. *Celaena haworthii* also was just appearing with *Nonagria fulva* among the rushes. The only day *C. haworthii* were at all plentiful was on September 4th, when they were flying among or sitting on the heather, whence they dropped suddenly on the slightest approach of danger. Since then the weather has been more or less wet and stormy and nothing has been done.—W. G. CLUTTEN, 10 Hallwell Street, Burnley.

HABROSTOLA TRIPLASIA AT SHIPLEY.—On July 24th I took a fine specimen of *Habrostola triplasia* flying over nettles near Shipley, Yorkshire.—IBID.

LEPIDOPTERA OF CARLISLE, 1899.—Continuing my notes (*ante*, p. 194), I have to record that lepidoptera have been more numerous than during the earlier part of the season. I have not, however, collected systematically, having been largely occupied with other groups of insects. With a few exceptions I refrain from referring to such of the larger species as I have recorded from this district in previous years. The spring brood of *Pararge megera* was common in lanes, in the immediate vicinity of Carlisle, at the end of May and early in June. Both spring and summer broods occur very regularly with me, but in the east of the county, on the evidence of collectors resident there, it is rare. In the west, I have noticed it on the coast, between Silloth and Maryport. In fir woods, with an undergrowth of birch, *Adela viridella* occurred rather numerously; while among the firs themselves,

the Scotch Tortricid, *Coccyx cosmophorana*, was obtained sparingly. It has been taken in one wood here pretty regularly since 1893. It seems to fly quite naturally in the morning sunshine. *Retinia turionana* was to be had in plenty by searching the branches of young firs in plantations. A little earlier, pupæ were taken from the accumulation of resin at the extremities of the branches. The flowers of *Caltha palustris* yielded a plentiful supply of *Micropteryx calthella*. *M. seppella* was swept on a weedy railway bank, and probably came from *Veronica chamaedrys*, which grew plentifully on the ground. A single *M. mansuetella* was netted on the borders of a wood, and is a new record for this district. The beautiful *M. aureatella* was abundant in most of our woods. The locality for *Stigmonota dorsana*—the before-mentioned railway bank—was worked early in June, but only one example of this desirable species was taken. *S. perlepidana* swarmed, and to detect a superficially similar insect like *S. dorsana* among its numbers was well nigh impossible. On the same ground, *Dicrorhampha saturnana* and *D. herbosana* were also met with, whilst *Ephippiphora brunnichiana* and *Platyptilia gonodactyla* occurred among patches of *Tussilago farfara*. Some nice examples of *Eupoeilia maculosana* were disturbed and netted from a bed of *Agraphis nutans* in bloom. *Dasyceera sulphurella* was boxed off a fence. From the flowers of *Cardamine pratensis* a few *Adela rufimitrella* were captured. Usually a scarce Geometrid here is *Panagra petrarica*, but this June it was taken in some numbers by disturbing the dead fronds of bracken, its food-plant, among which it appears to have a predilection for resting. On rough meadow land, *Ephippiphora pflugiana*, *E. cirsiana* and *Glyphipteryx fuscoviridella* were much in evidence. The usual summer Noctuids came freely to sugar. The abundance of *Leucania comma* and the appearance of *Xylophasia hepatica* after an absence of some years, are perhaps the only things which call for comment. After the middle of July sugar attracted but little. During July *Tortrix forsterana* was occasionally met with in woods. In meadows *Sericoris micana*, *S. urticana* and *Xanthosetia hamana* were more or less plentiful. In August I noticed *Melanthia bicolorata* in considerable numbers on the banks of an alder-fringed stream; the ♀, as usual, was rare. By beating along hedge-rows after sunset, *Scardia arcella*, *Harpipteryx xylostella* and *Catoptria cana*, were obtained, also *Ecophora fuscescens* and *Phibalocera quercana*. The moors in the south-east of the county were visited on two occasions, and both outings were fairly successful. Wherever the heath had been recently burnt *Phycis fusca* was to be seen. The Crambids noted were *C. sylbellus*, *geniculeus*, *tristellus*, *culmellus* and *margaritellus*. *Nomophila noctuella* was generally common. Those essentially moorland Tortricids, *Tortrix riburniana* and the lovely *Mixodia schulziana* were common enough. *Carsia paludata* was taken on both visits. Single examples each of *Agrotis agathina* and *Calocampa solidaginis* were picked up. *Eupoeilia angustana* swarmed. A search for *Stilbia anomala*, which was taken on this ground by Messrs. Wilkinson and Britten, did not meet with any success. "Dusking," in the same district, produced *Peronea schalleriana*, *aspersana* and *variegana*, and *Paedisca solandriana* larvæ were beaten very freely from birches; isolated, stunted bushes in damp parts of the moors being the most productive. *Notodonta dromedarius* was present in numbers. *Leiocampa dictaeoides*, *Lophopteryx camelina*, *Asphalia flavicornis*, *Drepana falca-*

taria, *Amphidasys betularia*, &c., were also obtained. A few days ago, I was in one of the woods here and saw *Ephippiphora similana*, *Rhacodia caudana* and *Peronea comparana*. *Chelaria hibernella* abounded among old birches, but was getting worn, and a few *Argyresthia retinella* were in the same condition. I might add that *Macroglossa stellatarum* has been much commoner in Cumberland than for some years.—F. H. DAY, 6, Currock Terrace, Carlisle. September 6th, 1899.

SPILODES PALEALIS AND CUCULLIA ASTERIS AT SOUTHEND.—The larvæ of *Spilodes palealis* have occurred here in the umbels of *Daucus carota* this autumn. I may also record that the larvæ of *Cucullia asteris* are locally common near here on plants of starwort.—F. G. WHITTLE, 3, Marine Avenue, Southend, Essex. September 28th, 1899.

RESTING-HABIT OF MACROGLOSSA STELLATARUM.—I took a specimen of *Macroglossa stellatarum* at rest on a wall at Eastbourne about noon on August 14th, 1899, the sun shining brightly at the time. It was clinging to a piece of clothes-line touching the wall and looked at first sight exactly like a knot in the rope; I also saw several in a field of lucerne, on the road to Beachy Head. On September 17th, 1899, I saw a specimen of the same species hovering over flowers on the cliff.—C. W. COLTHRUP, 127, Barry Road, East Dulwich, S.E.

LASIOCAMPA QUERCUS MORE THAN TWELVE MONTHS IN PUPAL STAGE.—A larva of *Lasiocampa quercus* captured on May 16th, 1897, near Croydon and fed up on plum, pupated June 29th, 1897, but did not emerge until July 13th, 1898. I think this is not usual with southern examples.—**IBID.**

DIANTHOECIA LUTEAGO VAR. BARRETTII, IN WALES.—I spent three or four days in a remote part of Pembrokeshire last June; entomology was quite a secondary matter, but I saw a few ordinary butterflies about, including *Pyrameis cardui*, and I spent some time on three successive evenings on parts of the cliffs where *Silene* was flowering freely. The only moth I saw, with the exception of three Noctuids, was *Eupithecia venosata*, fairly plentiful. The three Noctuids captured were single specimens each of *Peridroma ypsilon* (*suffusa*), *Dianthoecia conspersa*, and *D. var. barrettii*. The latter was a ♀, and I kept her some days to obtain ova. She laid a good many, but they were unfortunately infertile. I landed one bright sunny day for a few hours on Ramsey Island, and found *Setina irrorella* very plentiful on the cliffs.—H. W. VIVIAN, B.A., F.E.S., Glanafon, Port Talbot. September 22nd, 1899.

CHRYSOPHANUS DISPAR.—"This is the only method left now by which we can collect British *Chrysophanus dispar*." This apologia for the monied amateur has haunted me ever since I read Mr. Tutt's remarks on the "Large copper," published three years since in the *Ent. Record* (vol. viii., 65), and I have more than once, in despair, been tempted to bid (unsuccessfully) for sale-room specimens of this much-prized species. In my wanderings in the eastern counties and in Huntingdonshire, I have always closely scanned any cases or cabinets which might happen to contain some unconsidered specimen. But hitherto I have not succeeded in unearthing new recruits to the limited ranks of *C. dispar*. The unexpected, however, happens in entomology as often as in every other form of sport, and while I have been "chasing the white blackbird" in every county but my own, two or

three specimens have actually existed within a couple of miles of our house. One day last July I happened to be calling at Pinner Hill, and noticed a faded case full of butterflies. Judge of my surprise when I spotted three *C. dispar*, two males and a female, included in the collection. My friend, Mr. Hilsham-Jones, informed me that the insects had been taken in the "thirties" by his father, so far as he knew, in and about Woodbridge, Suffolk, and he was kind enough to present me with the "coppers," though I regret to say the female was past recognition and faded almost white. The males were in better trim, being placed at the bottom of a row in the partial shade of the side of the case, and, luckily, owing to the air-tight case, neither dust nor mite had entered. The circumstance is, perhaps, worth recording, inasmuch as Woodbridge and Benacre, a reputed locality beyond the fenland, are not far apart, and possibly my two *C. dispar* (one is a very decent specimen, with perfect antennæ, and well-pinned) are Suffolks, since I understand the captor filled this case only with such insects as occurred in that particular part of the county. All the rest were almost entirely faded white, a couple of *Nomiades acis* sharing the general fate.—H. ROWLAND BROWN, M.A., F.E.S., Oxhey Grove, Harrow Weald. September 25th, 1899.

MACROGLOSSA STELLATARUM IN 1899.—*M. stellatarum* appears still to be abundant; I saw specimens at Lewisham on August 27th, and others in Chattenden Woods on September 3rd. On the latter date *Epinephale ianira* and *Coenonympha pamphilus* were still flying in good condition, and *Pyrameis atalanta* was in great abundance at Chattenden. The large number of *Pieris rapae*, everywhere on the railway banks between Lee and Strood, was very noticeable.—J. W. TUTT.

EUVANESSA ANTIOPA IN KENT.—I have to record the capture of a very good specimen of *E. antiopa* on August 18th, in Kent, but had the misfortune to damage one of the antennæ in the joint of the collecting-box.—F. B. ABBOTT, 8, Beaconsfield Road, Dover. August, 28th, 1899.

EUVANESSA ANTIOPA IN NORFOLK.—Whilst spending my holiday at Horsey, Norfolk, I have been fortunate enough to catch a specimen of *Euvanessa antiopa*. This insect was caught on August 28th, in the Staith Lane, at 12.30 p.m. I first saw it settle on an ash tree (from which a resinous sap was exuding), among a crowd of *Pyrameis atalanta*, about 10.45 a.m., and several times after, catching it at last by a lucky stroke of my net, at the aforesaid time.—DORRIEN GRAHAM Moon, Graham Villa, Hayter Road, Brixton Hill, S.W. September 1st, 1899.

COLIAS EDUSA IN HERTS.—I saw a female *Colias edusa* in my garden to-day.—(HON.) N. C. ROTHSCHILD, B.A., F.Z.S., F.E.S., Tring Park. September 3rd, 1899.

ORGYIA GONOSTIGMA AT BEXLEY, KENT.—On September 2nd I found ten young larvæ of *O. gonostigma* in the woods here. Last season I also had the good fortune to turn up this species in the same locality, so that it appears to be well established.—L. W. NEWMAN, 41, Salisbury Road, Bexley, Kent.

ACHERONTIA ATROPOS AT CASTLE BELLINGHAM.—I have found five larvæ of *Acherontia atropos* here, during this month and last.—W. B. THORNHILL, Castle Cosey, Castle Bellingham, Ireland. September 5th, 1899.

AGROTIS PUTA IN JUNE.—Through an oversight, my answer (*ante*, p. 248) to the Rev. G. H. Raynor's question (*ante*, p. 207) about *Agrotis puta*, only included instances of its capture in July, but I can now point to a few records of its occurrence in June. In *Ent. Rec.*, iii., 164 (1892), the Editor says that "*Agrotis saucia*, *suffusa*, and *puta*, all have double broods in some seasons, one in May and June, and a later in August and September," and on p. 183 of the same volume I stated that I had met with *puta* in the middle of June in Portland, my statement referring to the capture of two specimens at sugar there on June 18th, 1888. Again, since the publication of Mr. Raynor's note, Mr. G. T. Porritt has recorded, in *Ent. Mo. Mag.*, ser. 2, x., 210, the occurrence of *A. puta* in East Kent, between June 2nd and 8th last. In view of the above facts, the capture by Mr. Raynor of an example of *puta* on June 10th, need cause no surprise.—EUSTACE R. BANKES, M.A., F.E.S., The Close, Salisbury. *September 17th*, 1899.

AGROTIS PUTA IN JULY.—As I read the Rev. G. H. Raynor's note (*ante*, p. 207), his question was really intended to refer to a *spring* emergence of this species rather than to its appearance in July. I have heard of several captures in May or even the end of April, but the only one which I can at the moment definitely recall to mind was by my friend Mr. W. H. Jackson, of Walthamstow, at the end of April, 1891, at Ventnor. In the Isle of Wight the species normally appears in July, though it lasts throughout August. The following are dates from my diary: July 28th, 1891; July 29th, 1892; July 17th and onwards, 1893 (both sexes common, no doubt out earlier, but my visit commenced on that date); July 16th and onwards, 1895; July 18th and onwards (females from July 20th), 1896; July 24th, 1897 (female). The last two years I have been at Torquay till mid-August, and have seen very little of *Agrotis puta*.—LOUIS B. PROUT, F.E.S., 246, Richmond Road, N.E. *September 15th*, 1899.

As the question of the appearance of *Agrotis puta* in July has been raised, I should like to say that on July 20th, 21st, and 23rd, 1896, I captured no less than 25 of these insects, of both sexes and in good condition. They were all taken on the flowers of onions which had been grown for seed, a bait which was very attractive to moths at night and *Tanessidae* during the day. This was at Mersea island, in Essex. This year I took one *Agrotis puta* at light on July 23rd at Swanage.—DUDLEY WRIGHT, F.E.S., 55, Queen Anne Street, London, W. *September 14th*, 1899.

PYRAMEIS ATALANTA 500 MILES FROM LAND.—On a recent voyage from Valparaiso to Hamburg my brother caught a specimen of this butterfly on deck whilst about 500 miles from the Lizard. Though slightly injured in taking, it is on the whole in good condition, and appears to be a perfectly normal insect. My brother, who gave it to me, told me that he had seen numbers of this species flying about at the same time. There can be no question that it came from the coast, as the ship had not been in port for over three months, and the constant scouring and painting would have rendered it impossible for so many pupæ to remain unnoticed.—R. HAMLYN-HARRIS, F.Z.S., F.E.S., Zoological Institute, Tübingen, Germany. *September 1st*, 1899.

DOUBLE BROODS OF NOTODONTA ZICZAC, N. PALPINA, AND N. CAMELINA.—On July 20th I had imagines of all these species out in the cages, and the whole brood of each is now out. They all pupated at the same time,

viz., from July 1st-3rd.—L. W. NEWMAN, 18, Salisbury Road, Bexley, Kent. August 1st, 1899.

FOODPLANT OF *LASIOCAMPA CALLUNAE*.—I find that larvæ of *L. callunae* feed well upon aspen.—*IBID.*

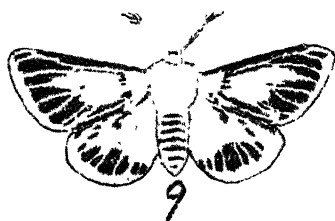
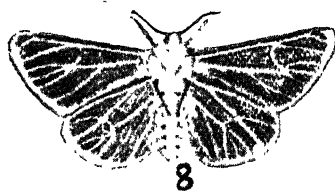
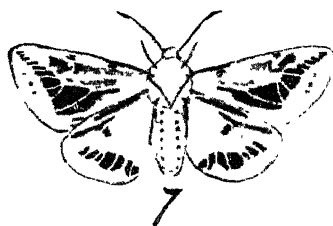
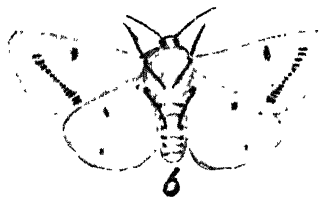
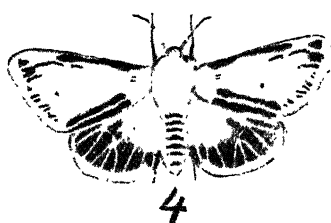
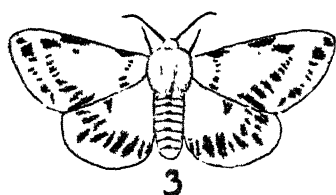
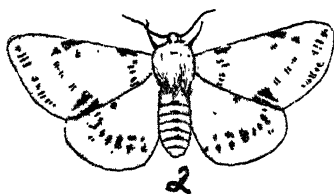
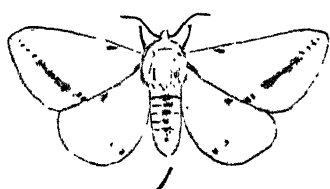
SATURNIA PAVONIA AND *LASIOCAMPA* VAR. *CALLUNAE* TWO YEARS IN PUPAL STAGE.—I have a number of pupæ of *Saturnia pavonia* and *Lasiocampa* var. *callunae*. The *callunae* are those of last year (1898), as also are some of those of *S. pavonia*. They are going over another winter, and appear to be quite healthy, for I opened some and found them alive and perfect. I never knew them, here, to remain in the pupal stage two winters before.—H. A. BEADLE, 6, Station Street, Keswick. October 5th, 1899.

CURRENT NOTES.

We have received from M. Padewieth, of Zengg-Segna, Croatia, a price list of a number of Orthoptera and Neuroptera, collected in Croatia and the Croatian littoral. Among others, we notice *Bacillus rossii*, Fabr., ♂, which is extremely rare in this parthenogenetic species, and an undescribed form of the same genus, in both sexes, well-set; *Saga serrata*, Fabr., ♀, and an imperfectly developed male of the same, the latter priced at 18/-. We believe that only one other male of this species is known to exist, and that is in the Vienna Museum. There are a large number of other interesting species in the catalogue.

Somehow we have missed noting the enjoyable outing that the Council of the Entomological Society of London spent at Oxford during the first week of July, at the invitation of Professor E. B. Poulton. The President of the Entomological Society was absent ill, as also was Mr. E. Saunders, Mr. Trimen alone representing the Vice-Presidents. Among the members and their friends present were Messrs. Donisthorpe, Druce, Jacoby, McLachlan, Merrifield, Walker, Tutt, Dr. Dixey, Professor Meldola and Colonel Swinhoe. An afternoon, spent at the Hope Museum, inspecting the treasures there, under the guidance of Professor Poulton and his able assistants—Messrs. Hamm and Holland—was followed by a morning visit there by some of the members, and a very enjoyable outing over the hills to the beautiful residence of Mr. Arthur Evans, where the party was very hospitably entertained. The pleasant meeting, too, in Dr. Dixey's rooms, was greatly appreciated. Much entomology was talked, and the informal meeting of our leading entomologists to discuss matters in which they are severally interested, and in which free and easy criticism is indulged, does much to strengthen the good fellowship that exists between them as individuals, and to rub off the corners that are bound to arise wherever differences of critical opinion must necessarily be expressed. Entomologists as a whole, and the members of the Council of the Entomological Society in particular, therefore, owe to the generosity of Mrs. and Professor Poulton, and their intimate Oxford friends, a debt of gratitude that is really of more importance than at first sight it may appear. We trust that successive batches of the official members of the Entomological Society may long have the opportunity of accepting the hospitality of the Hope Professor and his friends.

We hear that Mr. Elgar has had the good fortune to add *Andrena lapponica* to the British list. The species was taken near Maidstone.



ABERRATIONS OF *SPILOSOMA LUBRICIPEDA*.

The Entomologist's Record

AND

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Lincolnshire aberrations of *Spilosoma lubricipeda*.

(Illustrated by Plate.)

By C. OSBORNE S. HATTON.

The following notes on *Spilosoma lubricipeda*, bred from larvæ taken in Lincolnshire during the first week of August, 1897, may prove interesting. The larvæ were found in large numbers feeding on elder, but always near a house, and especially (I fancied) opposite to windows, as if the female had been attracted by the light and had laid the eggs close at hand. I could only find an occasional one on elder at any distance from a house, whereas in some of the cottage gardens they were so numerous that I could easily have picked off 150 in an hour. Unfortunately I was not going home for several days, and so had not room to take more than about 70 (I believe the actual number was 73). These I was obliged to keep for three days in tin boxes till I reached home, when they were transferred to large cardboard boxes, well ventilated with muslin windows. The majority pupated in about ten days, but some continued feeding for about three weeks, and were fed on elder all the time.

In all there were 68 pupæ; six I gave away, and I believe they met with an accident and did not emerge; six did not emerge; one was deformed, and the remaining 55 I set. The imagines vary gradually from a light form with scarcely any black on the upper side of the wings (fig. 1), to a very dark form with practically the whole of the hindwings, except the veins, black, and the forewings black with the exception of the veins and a triangular piece in the middle of the wings (fig. 5). In no case, however, does the black extend to the fringes of the wing. Between these there is a distinct form, which has the black on the forewings in the same places as the type, but all the marks larger and more conspicuous, and the hindwings with a series of oblong black dots between the veins, running parallel to the outer margin, and distant from that margin about one-third of the distance of the margin from the base of the wing (figs. 3 and 4). All these latter are females. The 55 may be grouped as follows:

- (a) Typical, 38 (♂ 22, ♀ 16).
- (b) Between figs. 2 and 3, 6 (all ♀).
- (c) Between figs. 4 and 5, 11 (5 ♂, 6 ♀).

The undersides of the darker ones of *c* are entirely black except the nervures and fringes (fig. 8). The undersides of *b* are thickly smeared with black, but do not appear to have any typical form of

marking (fig. 7). The moth in fig. 9 appears to have the forewings like *c* and the hindwings of *b*. A dark form is taken sparingly at Grimsby. I saw one or two of the specimens some time ago, and as far as I can remember they were something like fig. 9, but not quite so dark. One or two of the same form have also been taken at Market Rasen, but these again are not quite so dark as the Grimsby ones, if I remember correctly. I do not know how far south they occur. A few which I took at Gainsborough did not contain any aberrations.

On breeding *Drepana harpagula*.

By G. C. GRIFFITHS, F.Z.S., F.E.S.

Opportunities for the study of the early stages of this local moth fall to the lot of so few of our British entomologists that some notes as to its habits may possibly be of interest. A captured female will occasionally deposit a few eggs in confinement, laying them singly on the edges of the lime leaves (*Tilia parvifolia*) just at the bottom points of the serrations. The eggs are oval, and when first laid cream-coloured, but after about forty-eight hours acquire a beautiful red bloom upon the upper surface, so that they much resemble little white-heart cherries. The whole duration of this egg stage is usually about eleven or twelve days, but two days before the emergence of the young larva the egg deepens in colour to a dark purple-brown.

The larva newly disclosed from the shell is a perfect little hook-tip in appearance, of a dark red colour, and resting, when it does rest, with its head and tail raised. But on the first two or three days of its larval life occur the chief difficulties to be encountered by the entomologist who would breed it.

It is so restless that it wanders from its food continually, and unless closely watched and replaced as soon as possible upon the leaves with a camel's-hair brush will speedily perish. It appears to prefer to begin to feed either just on the tip of the leaf or on one of the curves by the side of the leaf-stalk, but throughout its larval existence it is always found on the upper surface of the leaves. At first it only nibbles half through the substance of the lime-leaf, but after the first skin-change begins to bite quite through, cutting a long narrow sinus into the leaf. After overcoming its youthful restlessness and approving of the food provided for it, which must be the small-leaved lime, not *T. europaea*, the larva of *D. harpagula* is one of the most contented in disposition. It practically never leaves its food-plant, and, indeed, seems to prefer its leaves to be somewhat dry, being often found at large on trees with stunted hard leaves, a character in which trees of *T. parvifolia* differ considerably, probably owing to variation in soil and situation. After the second skin-change the larva begins to assume whitish marks upon the back; later these become yellowish, until, in the adult period of larval growth, the back is coated with rich deep yellow, and the sides with purple brown, the whole forming a colour-combination of great beauty, which is enhanced by the graceful contour and pose of the larva.

The term of larval life in captivity is usually about eight weeks, but either this stage or that of the egg appears to be more prolonged under natural conditions, as specimens bred from the egg are gener-

ally in pupa about three weeks before the full-fed larva can be beaten in the woods.

Although the larva of *D. harpagula* feeds quite exposed, it does not seem to be subject to the attacks of insect foes. I have never bred a parasite from captured larvæ, and believe this experience can be confirmed by that of Messrs. Grigg, Prideaux, Bartlett, and others.

The full-fed larva now begins to join together two points on the upper surface of a leaf with a thick band of silken cords; then at a distance of rather more than a quarter of an inch it affixes another band of silk parallel to the first. Using them as a basis it rolls the leaf together into a neat funnel closed at the lower end; lastly it fills the upper end with a brownish web of silk, having several round apertures, through which the head of the pupa may be seen. The pupa is at first light brown and smooth, but after about twenty-four hours becomes thickly covered with a white powder, probably exuded from its pores in a liquid state. As this powder appears to be quite insoluble in water, it may well be that its function is to protect the pupa from damp during the long months of winter, when it is lying in its cocoon amongst the dead leaves at the foot of the lime-trees. It is certainly a delicate species, easily killed or crippled by cold, as on one occasion I lost nearly a whole brood in the pupa state in consequence of cold weather setting in just as the moths were developing.

The moth usually emerges from its cocoon in the morning, after about eight or nine o'clock. It rests with its wings outspread with the forewings slightly covering the hindwings. There is no record of a second brood of the moth in the English locality, but on October, 16th, 1893, I bred a small and rather dark-coloured male, no doubt owing to some unusually warm weather which occurred during that autumn.

Notes on the Habits of the larvæ of *Eriogaster lanestris*.

By A. RUSSELL, F.E.S.

I took a nest of the larvæ of this species at Polegate junction on May 21st last, and the few notes I made during the successful rearing of the larvæ may prove of interest to some at least of my fellow entomologists. The nest was found in an exposed position on the branch of a small hawthorn tree growing on the bank of a disused railway siding. The web of the nest was compactly and evenly woven. It was about six inches in length, and was fastened to projecting thorns and to the end of the branch. Ingress to and egress from the interior was through one small opening only. A single larva was visible on the exterior, the remainder, afterwards ascertained to be about 100 in number, being snugly ensconced within. On returning home the following day the nest was fastened to the branch of a large hawthorn tree growing in my garden, and covered with a good sized gauze net, through an opening in the back of which the larvæ were afterwards supplied daily with increasing quantities of their food-plant. The larvæ when taken were three-quarters of an inch in length, and had apparently undergone at least one moult. Upon being placed upon the hawthorn tree they constructed another and a larger nest, enclosing the old within the new. The habits of the larvæ were most interesting to watch. Their mode of feeding was curious; they seemed to make short and hasty snatches at their food-plant, wasting a considerable portion of it in doing so.

As far as I was able to observe they fed in the day time only, preferably in the early morning and in the late evening. Generally after a meal, at night time, and when very wet, they withdrew to the interior of the nest. It may have been a coincidence only, but whenever they so retired one of their number remained upon the exterior, a stationary sentinel over those within. In addition to constructing a fresh nest the larvæ wove lines of webbing along the bare branch and branchlets adjoining it, and when the sun shone they became most active, racing after one another along the webbing at a surprising rate. Occasionally first one and then another of them would take a hasty bite at a leaf of their food-plant, but so long as the sun was shining brilliantly upon them they seemed to prefer exercise to feeding. If disturbed at any time, they fell from where they were lodged to the bottom of the net. The larvæ moulted twice after I had them, the first moult taking place within ten days. They were then similar in appearance to the figures 1 and 1A, given in Buckler's *Larvae*, though, of course, not so large. They again moulted about the middle of June, and after this, their final moult, they were most beautiful in appearance, and I deeply regretted my inability to paint a true picture of one of them. According to Newman the larvæ pupate at the end of June, but although quite one half of those I had were by this date fully two inches in length, and apparently full grown, they showed no inclination to spin their cocoons, but continued to feed well until July 12th. They then commenced to pupate, and by July 20th, all of them, with the exception of three or four, had formed cocoons. These were constructed either within their nest or in a mixture of their own frass and dried pieces of wasted food-plant. I was never successful in observing a larva spin its cocoon, but this may have been due to my absence from home during a portion of the time the larvæ were so engaged. The majority formed single cocoons, others double, while in some instances a general cocoon was formed by three or more of the larvæ. The cocoons, oval in shape and measuring $\frac{3}{8}$ " in length, and $1\frac{1}{8}$ " in circumference, were principally of a whitish tint, a few were brownish and one or two pale greenish.

The Larva and Pupa of *Malacosoma alpina*.

By J. W. TUTT, F.E.S.

The possession of a species so very similar to others that one has known for many years is always interesting, and when this similarity is continued through all the stages of the insect's existence, it becomes still more interesting. Such an insect is *Malacosoma alpina*, found only at very high elevations, yet so like *M. castrensis* and *M. neustria* in some respects that it is difficult to separate certain stages of them except by careful study. The larvæ described were obtained at Fusio during the second week of July, 1899, at an elevation of from 6,000ft. to 7,000ft., on the low plants growing there. Where this batch was found others were exceedingly numerous. The individuals in each nest appear to be of about the same size, although those of different nests vary much in size. When full-fed they leave the nest and wander about solitarily until pupation. They fed in confinement on *Alchemilla vulgaris*, and although tried on bilberry they ate it so sparingly as almost to starve on it. They do not look particularly

active, yet the larvæ are capable of moving at very considerable speed on occasion. The most forward of the larvæ began to spin up about July 25th, but the more backward ones are now (August 9th) only feeding slowly, and making but little progress. Probably the method of treatment, added to the vicissitudes of travelling, is not to their taste.

The full-grown larva in its last instar extends from 1.25mm. to 1.50mm. in length; tapers slightly from the 3rd abdominal segment to the head, and less so to the anus, so that it is fairly cylindrical. The head is only rather less in width than the prothorax, dull, deep, leaden-grey in colour, covered all over with brown hairs, considerably shorter than the longer ones on the body; the surface of the head is covered with a number of minute black spots (aggregated in little groups of from three to six) which do not seem to be related to the hairs in any way. These little groups of spots are again aggregated into two rows on either side of the median suture, but not reaching quite to the clypeus; outside these two rows are two parallel areas of about the same width without any spots, the latter being continued in less regular rows over the rest of the head. There are six black shiny ocelli on each cheek—one median, four others forming a curve outside it, and one in the same line of curve as the last named, but much above them. Some larvæ have the fifth and sixth of these ocelli absent. The antennæ are black with whitish segmental incisions and a white base. The labrum is shiny black, and between the labrum and the clypeus is a small shiny black piece (= ? the parclypeal piece). The other chitinous mouth-parts are black with paler incisions; there is also a very marked spinneret. The true legs are black with very numerous fine brown hairs scattered over their surface; each leg consists of a fleshy base, a very narrow chitinous piece, then three joints (gradually becoming smaller) and finally a semitransparent, pale brownish claw. The prolegs consist of two large basal rings of soft tissue, and then a long extensile joint carrying a row of about 24 strong brown hooks. The anterior subsegment of the prothorax is pale, and on either side is a lateral projection which may represent a tubercle, otherwise the longitudinal disposition of the lines and markings appears to be similar both on the thoracic and abdominal segments. The larva is clothed with brown hairs, not at all densely enough to obscure the larval skin which gives the animal its colour. The length of the brown hairs is very various (the longest rather more than half the diameter of the larva in length, except on the 7th-9th abdominals, on which many hairs are fully as long as the diameter of the larva). In the disposition of the hairs no special arrangement with regard to tubercles, subsegments, &c., can be traced; ventrally the hairs are sparser and shorter. Looked at dorsally, the larva shows a blue line on each side, a broad chocolate band above this, and a median whitish-yellow line broken up by some minute black dots (hair-bases). In most specimens there is a narrow, irregular, very fine, brownish-red line, close to either margin of the median band and to be detected on the anterior segments. These lines are much more pronounced and continuous in younger larvæ, which, therefore, resemble more closely the larva of *M. neustria*. The spiracles are situated on a broad blue band, touching, immediately beneath, a narrow yellow one; above the blue band is a narrow chocolate band with a brown line in the middle of it, and above this is the narrow blue band already described

as being seen dorsally. All these longitudinal bands are somewhat irregular and broken up by minute black spots. The subspiracular yellow line is along the upper edge of a marginal flange that is fairly pronounced, and, at the anterior portion of each segment, rises considerably above the level of the spiracles. The lower margin of the flange being almost on the same plane, viewed laterally, as the eye, and carrying a fair share of hairs, masses them so that the ventral area of the larva is not very visible (this effect is more obvious in the less fully fed larvæ). The spiracles are dark fuscous. Seen from beneath the subspiracular area (below the yellow line) is blue but with a less bright and more slaty tint than that above. The venter is black; a number of white markings (most abundant towards the incisions) are arranged so as to form two longitudinal bands, one on either side of the middle line. In some specimens, the three blue lines noticed so encroach on the yellow and brown intermediate lines as to leave them hardly entitled to be called bands. The anal plate is blue with a small brown spot on its anterior margin, and the bases of the anal prolegs are also blue. In progression, the larva alternately hides and exposes a narrow zone between the segments, the anterior segment sliding backwards over it. This small portion is bounded on each side by rows of minute glistening white points at the bottom of fine sulci. Dorsally, there appear to be only two subsegments, a longer anterior and shorter posterior, but laterally (above the spiracular level), each abdominal segment is subdivided into four portions, of which the anterior is rather less than a third of the width of the segment, the second rather more than a third and carrying the spiracle, whilst the third and fourth are about equal and make up the remainder of the width of the segment. The thoracic segments also appear to be composed of four subsegments although their arrangement is not quite identical with those of the abdominal.

The cocoon is formed of white silk, loose and flossy on the outside, with a more closely woven, egg-shaped, inner structure, the latter about 22mm. long and 6mm. wide, evidently plastered inside with a yellow material similar to that in the cocoon of *M. neustria*, although some of those under observation appear to have been too weak to secrete the full quantity, and it is somewhat irregularly and unevenly distributed.

The male pupa is dull black in colour about 15mm. in length, and 4mm. in width. Viewed laterally or dorsally the pupa is of about the same diameter from the 2nd to the 6th abdominals; anteriorly to the 2nd abdominal it narrows, and the prothorax and dorsal head-piece form the front of the pupa, the head being ventral. From the 6th abdominal segment backwards the pupa also narrows, the 7th segment being convex, and, the 8th, tending to be concave, gives the appearance of a sudden narrowing at the end of the 7th segment. The 6th and 7th (and to a less extent the 8th) segments being narrower ventrally than dorsally, throws the three terminal segments forwards ventrally. The pupa generally is covered rather densely with fine short brown hairs, more abundant dorsally than ventrally, but absolutely wanting on the appendage-covers and the ventral aspect of the three last segments. The anus is marked by two large rounded projections with a deep sulcus between them; this is placed quite ventrally and beyond it is a large rounded boss (cremaster) covered

with rather stouter hairs than those on the dorsum of the rest of the pupa. The 9th segment ventrally has a slight sulcus with a papilla on either side, the 5th and 6th segments carry leg scars, and there is a slight trace of a longitudinal carina on the 7th abdominal. The whole pupa, except the three terminal segments, has a quantity of fine yellow powder spread over it (thickest where the hairs are strongest). Dorsally, the prothorax has a distinct carina, on the mesothorax it is rather a polished line than a carina, but on the metathorax it is again carinate. The metathorax is also narrowed in the median line (front to back); the anterior margins of the metathorax and 1st and 2nd abdominals are raised into slight ridges, and the 1st abdominal forms a slight waist. The surface of all the segments (as far as the yellow dust on hairs allows one to see) appears to be composed of fine raised points. The dorsal head-piece is well-developed, of similar shape to the prothorax (roughly triangular). The mouth-parts consist of a labrum, mandibles on the outer edge of the labrum, a wide labium and labial palpi which are median to the maxillæ. The central pair of the structures, below the mouth-parts, appears to be the femora of the 1st pair of legs, whilst outside these are the 1st pair arranged in the usual form, a narrow strip between these and the terminal half of antenna is all that appears of the 2nd leg, except the tarsal tips that project just beyond the antennæ. The 3rd pair of legs do not appear to be visible. The antennæ are very large and form an abrupt bend around the tip of the 1st legs. The face-parts are produced on either side much below the mandibles and hang down like lappets. The glazed eye is barely visible against the antennæ. All these parts are black, except the labrum, mandibles, and basal portion of the labium, which are colourless and semitransparent, and appear to be more polished than the rest of the pupa. There are a few hairs on the vertex of the head, and another little brush just above the labrum. The wings reach almost to the end of the 4th abdominal segment; there is a distinct Poulton's line, and the hindwing is almost entirely covered by the upper. The prothoracic spiracle is represented by a narrow slit in the usual position, but is rather longer than usual. The spiracles on the 2nd and 3rd abdominal segments are covered by the wings, the remainder being oval wrinkled depressions without any obvious lumina, that on the 8th is of course aborted, the scar being present. The *female* pupa agrees generally with that of the male, especially in the three terminal segments having less yellow dust scattered on them, the angle that these three segments form with the rest of the pupa is much less obvious so that from the face above the labrum to the cremaster, the median line of the venter forms a straight line, the dorsum being curved. There is a median sulcus on the 8th segment ventrally, and two small tubercles at its posterior margin. The anterior margin of the 9th segment has also a similar sulcus and two tubercles. The anus is much as in the male, but the cremastral boss is much less fully rounded. The antennæ have the same bend as in the male, and do not cover the glazed eye quite so much; the 2nd pair of legs are more fully exhibited, whilst the antennæ hardly reach down as far as the 1st pair of legs. The wings reach to about the middle of the 4th abdominal segment, exposing the leg scars of that segment. The spiracles form a distinct sulcus with a raised margin, the whole placed in a slight hollow.

The ♂ and ♀ pupæ above described produced next day (August 10th) a ♂ and ♀ imago respectively.

Notes from East Devon.

By W. S. RIDING, B.A., M.D., F.E.S.

I have generally a grumble on the unproductiveness of sugaring in this neighbourhood, but last July it reminded me of old days at Freshwater when moths jostled one another on the patches, and a quick eye and deft hand were wanted to secure varieties, and one never went home with an empty box. The cause was not far to seek. The east winds of spring and early summer were not laden with "blight," as the country folk call it, and our young shoots were spared the attacks of green-fly with all their prolific possibilities; there was no coating of leaves with honey-dew. Some half-dozen times or more I came across young shoots of ivy and elder thickly covered with ants hurrying to and fro, and, on examining them, found they were feeding on the secretions of aphides and doubtless carrying off prisoners to their honey-dew farms. I do not think ants were more abundant generally, neither were their other enemies, lady-birds and lace-wing flies, in either the larval or perfect stages. Most of the common July visitors of the Noctuid group put in an appearance—the *Caradrinae*, *C. alsines* and *C. taraxaci* were especially abundant, so were the Tortricids, *Paedisca profundana* and *Tortrix rylostearia*, as well as the Geometers *Acidalia dimidiata* and *A. bisetata*. The rarer insects *Calymnia pyralina* and *Hyppena albistriigalis* were both much more numerous than of late years. The former kept coming out from early in the month till the end, when the ♂s were getting worn. Three were of the duller brown colour with purplish hue. I kept two ♀s for ova, but, as I had previously found, could not induce them to deposit, one, though supplied with honey, dying in a few days. The *H. albistriigalis* were skittish and difficult to box, they were in better condition than is usual in July, and did not settle on the sugar till late in the evening. From three ♀s I obtained about 60 ova; these are very inconspicuous and difficult to see on a chip box without a lens, only becoming slightly greyish before hatching. I gave the young larvæ portions of most of the plants I could think of as occurring in the locality where I take the imago, both flowers and leaves, and I also tried them with lettuce, knot-grass, thyme (flowers and leaves), and hop. I did not try heather, as suggested by Mr. Prout, as none grows within 1½ miles of the spot, and it cannot be the natural food. One and all were refused, and the young larvæ, after hopping about and surveying their surroundings in Geometer fashion, died in from 24 to 36 hours. I managed to get a brief description of their structure, which runs as follows:

Head, very large, disproportion to body greater than usual, grey with black lines. Body translucent, glassy-like, and slightly reddish on thorax and anterior part of abdomen. Prolegs, three pairs. Tubercles arranged as on Noctuids, one long seta from each, 1½ times the breadth of the body, and several on head and feet.

Failures are sometimes useful, as they may give hints leading to success; we now know, at all events, that the larvæ feed in July and August. The ♀s seem for the most part darker than the ♂s.

We all meet with centipedes frequently about our sugar patches, but I have never seen one attacking a moth till this year, and then I did

twice. In the first case, I found one on the back of an *Apamea didyma*, beginning to make a meal off its head, and as the latter remained motionless it must have been already stung. Later, on the same evening, on another patch, I found a *Cosmia trapezina* with the front part of its head demolished and a centipede in a similar position. The wings and body of the moth were arched, the result presumably of the poison injected.

In early August I spent many hours in woods and beside hedges and ditches hunting for the larva of the *Stachys* plume or plumes. It was an exercise of patience, as I came to consider myself well rewarded if I returned home in two or three hours with three or four. I could not come across any colony—the season certainly has not been a favourable one for the *Amblyptiliae*. I found both the red and green larvæ; the former are generally the smaller and to be met with before the purplish red corona has fallen off, the latter larger and on plants which are seeding, the colour being evidently protective. From the few I kept I bred three imagines, two large with olive-green, black and white markings—typical *acanthodactyla* (*cosmodactyla*)—and one small and reddish-brown—an equally typical *A. cosmodactyla* (*acanthodactyla*). *Macroglossa stellatarum* has been very abundant, as everywhere else. In the garden it preferred the flowers of lavender and scarlet geraniums, a luxuriant bed of petunias adjacent being comparatively neglected. It was on the wing early in the mornings and in the evenings. All the common butterflies, too, have been here, there, and everywhere; a few *Zephyrus betulae* were to be found around the blackthorn bushes on the higher grounds, and in September I saw three *Colias edusa*. On the 28th and 29th of that month two *C. hyale* flitted in sunny meadows from one yellow head of hawkbit to another close at my feet, but I had no net with me.

Early in the first week of September a recently-emerged *Sphinx convolvuli* was brought to me from Honiton, mutilated in transmission. I heard of a second being taken the following week, and on September 23rd I netted a worn ♂ on a bed of *Nicotiana affinis* in the garden. I saw no others, though the plants had been watched at dusk since the end of August. Light has so far been very unattractive this year.

Since my last notes on the obsolete form of *Zonosoma annulata*, I have bred part of a third brood, and, singularly, most of these are the var. *bi-obsoleta*, though the parents were var. *obsoleta*, and only two of these had feebly marked rings on the hindwings. This shows there must be an inherent tendency to the obsolescence of the rings. Most are ♀s, as they were last year—90 per cent. I managed to get pairings of the *bi-obsoleta* form, and ova, larvæ, and finally pupæ followed in due course; the latter formed during the first and second weeks of September.

The larvæ of *Arctia villica*, which I kept last year exposed to all possible sunshine and fed on lettuce as long as it lasted and then on cabbage, spun up in March and appeared as imagines in April. They showed minor variation in the size and shape of the cream-coloured spots which in two were very small, and also in the union of the two anal spots of the forewings by a broad or narrow neck. As this occurred in a majority it may have been transmitted by the ♂ parent, unknown. All the *Angerona prunaria* var. *sordidata*, bred true this year, there were no reversions to type. Several are asymmetrical as

regards size, and one ♀ is bleached, the entire wings being almost unicolorous only faintly showing the band.

The lichen-feeders did badly, the ova either did not hatch or the larvæ died—the seasonable conditions probably had to do with this, as I have not netted a single *Cleora lichenaria* in the garden, nor has one come to light, although generally the insect is far from scarce. The *Acidalia* about which I was in doubt, is *subsericeata*, a new record for these parts. Another is *Cabera rotundaria*, a specimen of which emerged in June from a pupa which, as larva, I beat out of elder last autumn.

The pupæ of *Abraxas sylvata*, bred from parents with purely leaden grey wings from Yorkshire, produced some 40 imagines. All these took after the type, not one resembled the ♀ parent. This corroborates last year's experience. There were not even unusual blotches on any of the specimens as I then found on four or five.

Third broods have occurred this year in other instances besides that of *Z. annulata*. Five of the pupæ of the second brood of *Drepana binaria* produced imagines in early September (one ♂ and four ♀s)—and almost an entire third brood of *Z. porata* appeared. In both cases larvæ of the second brood were to be beaten out of the hedges at the same time, and some of these have not even yet pupated. I expect these partial third broods hardly ever occur under natural conditions.

Susa in June: A further contribution to the Fauna of Piedmont.

By H. ROWLAND BROWN, M.A., F.E.S.

Mr. Tutt has very fully recorded his observations of lepidoptera at Susa in August (*Ent. Rec.*, vol. x., pp. 89 and 118), and perhaps the following notes upon my experiences in June last may be of further service to collectors contemplating a tour earlier in the year in these, apparently, little-explored regions. Crossing from Briançon to Oulx I joined the Mont Cenis line at the latter place, after a cold and rather disappointing journey, memorable rather for the confiscation of my kodak camera by the Italian frontier police, than for any captures of the entomological order. An hour or so in the train brought me to Bussoleno, on June 20th, and finally I arrived at my headquarters. The first two days, however, were sufficiently discouraging, as the rain never ceased to fall with tropical violence, save for about an hour on the 22nd, when I issued out net in hand to try my fortune at the back of the town. As at Digne, I found the high country on the Mont Cenis road generally unproductive, but the environs of the town, and the beautiful woodland paths and meadows on the road leading up to Sta. Maria della Losa, swarmed with insects of all orders. The season, however, was by no means forward, and even this happy valley had felt something of the extraordinary cold wave which seems to have swept southern Europe at the commencement of April. In any case, I think collectors who wish to find the Rhopalocera of Piedmont in all their glory, will be better advised if possible to defer their visit a week or two. Mr. Tutt has described the geography, as well as the beauty which delights the eye at every turn in this most picturesque of corners; it only remains, therefore, to give in detail the observations made by me between June 21st and the end of the month.

HESPERIDES.—*Nisoniades tages*, going over in the high woods

above Sta. Maria. *Syrichthys carthami*, in fine condition, larger and brighter than my Swiss specimens from Berisal. *S. fritillum* var. *serratulae*, a few. *S. malvae*, same locality as *N. tages*, very worn. *S. sao*, fresh and generally distributed. *Pamphila sylvanus*, *P. comma*, *Thymelicus lineola*, *T. actaeon*, presenting no differences from the usual British forms.

PAPILIONIDES.—LYCAENIDAE.—*Thecla pruni*, small and worn, left bank of the Dora. *Chrysophanus hippothoe*, type in magnificent trim, among the long grass by a streamlet, near Sta. Maria. *C. dorilis* var. *montana*, same spot. *C. phlaeas*, *Cyaniris argiolus*, first brood (?) in the uplands. *Plebeius aegon*, *P. argus*, and *Cupido minima*, all occurred sparingly in the places I visited, but the *Lycaenidae*, generally speaking, were not plentiful, except *Polyommatus astrarche*, *P. icarus*, and *P. bellargus*. *P. eumedon*, which I have not yet met with elsewhere in any profusion, abounded in the marsh meadows where the food-plant *Geranium sanguineum* grew; the steel-blue lustre on the wings of the freshly emerged imago is reminiscent of the *Erebiidi*, and quite as bright. Of *P. escheri*, I saw no males, but took two fine females on the first day of my visit in the intervals of the downpour. *P. hylas*, scarce, females strongly and beautifully marked. *P. corydon*, just coming out. *P. meleager*, also emerging, June 27th. *Nomides semiarqus*, rare. *Lycaena euphemus*, two large examples at the highest point I touched above Sta. Maria, by the stream which waters the pine and beech wood—a veritable garden of Eden for butterflies. *Lycaena arion*, occurring commonly, but rather worn. ERYCINIDAE.—*Nemeobius lucina*, practically over in the high woods. PAPILIONIDAE.—*Papilio podalirius*, a few fitting about the walled gardens in the town. PARNASSIDAE.—*Parnassius apollo*, a splendid form. *P. mnemosyne*, occasionally in the pastures on the Mont Cenis road. PIERIDAE.—*Pieris brassicae*, *P. rapae*, *P. napi*, *P. daphide*, *Leucophasia sinapis*, in the woods. *Colias edusa*. *C. hyale*, very plentiful everywhere, and much more so than the preceding species, of which a brood was evidently hatching out. *Euchloe cardamines*, a few still flying, June 27th. *E.* var. *euphenoides*, newly emerged, on the Mont Cenis road, June 24th, at about 3,500ft. APATURIDAE.—*Apatura ilia* ab. *clytie*. I took one fine male, June 24th, in the willow woods by the Dora, and devoted a whole morning next day to the species, with the result that I captured (and liberated) one battered individual. I had hoped to discover *Limenitis populi* in this valley, as it is noted as occurring in Piedmont, but could find no trace of it. These woods in fact, which looked so promising, yielded next to nothing on this or subsequent visits. NYMPHALIDAE.—*Dryas paphia*, one male with very light markings, in a wood below the Mont Cenis road, June 23rd. *Brenthis selene*, *B. euphrosyne*, same place, but evidently on the wane. *B. amathusia*, very common in the meadows about Sta. Maria, and larger and more finely marked than my Alpine specimens from Zinal and elsewhere. *Argynnis daphne*, I saw but one, and that fresh from the chrysalis. *A. lathonia*, generally common and fine. *A. aglaia*, *A. niobe* ab. *eris*, *A. adippe* and the ab. *cleodoxa*, large, and in splendid order. *Melitaea phoebe*, not uncommon. *M. didyma*, females a dull dun, males brightly coloured. *M. dictynna*, just coming out at the higher elevations. *M. athalia*, abundant. *M. aurelia*, a few in the meadows of Sta. Maria. *Neptis lucilla*: I worked hard for this insect,

but owing, perhaps, to the lateness of the season my bag was nil. The chestnut forests, in which it undoubtedly occurs later, clothe the lower slopes of the mountains on every side, and very beautiful they are. Twice I saw single specimens in the woods below Sta. Maria, but I was not fortunate enough to get either. Kane gives the end of the Susa valley as one of the European localities—the furthest west I should think—but July and not June, for this particular place, would seem a more accurate time of appearance. *Pyrameis atalanta*, *P. cardui*, and *Aglais urticae*, all evidently hibernators, with an occasional out-at-elbows *Euranessa antiopa*. *Eugonia polychloros*, on the contrary, was in fine condition, and occurred in the neighbourhood of the vineyards, the paths leading through which, in the late afternoon, were much frequented by *Polygonia egea*, and more rarely *P. c-album*. *P. egea* was evidently freshly emerged, as I neither saw nor took a single worn specimen, but in these narrow vineyard ways it was by no means easy to net, whether sitting on the irregular stone work of the walls, in the crevices of which it appeared to pass the night, or rising suddenly from the hopelessly stony mule tracks. **LIBYTHEIDAE.**—*Libythea celtis*: this was the insect *par excellence* of the neighbourhood. I first found it on the stony ground high up on the left bank of the Dora, above Susa town, on June 23rd. But it was much commoner on the Sta. Maria road, where it would settle on moisture and mule-droppings, starting up on my approach, but generally flying no further than a convenient perch of hazel branch, whence it was easily removed. I had never seen the insect on the wing before, and am now much puzzled to describe its method of flight. It rather suggests a cross between *Pararge egeria* and *Aglais urticae*. Further, I could find no plant of *Celtis australis*, its known food-plant, in the hills about Sta. Maria (which run up to 3,000ft.), though it may grow lower down. With regard to the hibernation of this species there seems to be some doubt. In his *European Butterflies*, quoting from Hübner, 447-9. Ochsenheimer, i. 2, p. 192, and Godart, *Hist. Nat. des Lépidoptères de France*, Dr. Lang gives March as the time of appearance. and again from January to July, which latter statement the author has informed me is a misprint. Mr. Merrifield says that, in a backward year, he took it early in June, at Crevola, on the Italian side of the Simplon, none of his specimens, with a single exception, being in good condition. He thought they were hibernated; but if the insect appears in March in the Italian localities, these may have been a remnant of the first brood, while the one fresh specimen may have been the forerunner of the brood which I found out in such perfect condition at Susa. This view is further supported by a record of Miss Fountaine's (*Entom.*, xxx., 11), in which she mentions a single *L. celtis* at Taormina, Sicily, in June; but Mr. Leech, who was there at the end of March, makes no mention of it (*Entom.*, xvii.). In *Butterflies of the Riviera*, p. 51, Mr. F. Bromilow gives "January, and again from March to the end of July," and mentions the capture of a full-grown larva on May 15th, which appears to point to the probability of the January appearance being hibernations of the June or second brood. I notice, too, that Mr. Lang, in his current papers on European Lepidoptera in *Science Gossip*, makes no mention of the cherry as an alternative food for the larva. Neither at Digne (Donzel) nor at Susa, so far as I could observe, does *Celtis australis* grow, but in both places the cherry,

wild and cultivated, is a frequent and welcome tree. Other records I have come across for the summer appearance of *L. celtis* are given by Mr. R. B. Postans (*Ent. Record*, x., p. 34), who took worn specimens in June, at Isella, in 1894, but observed none there in 1897. Mr. Tutt (*Ent. Record*, x., p. 119) saw it at Susa after August 10th, while Mr. Lemann (*Ent. Record*, vii., p. 223) found it fairly abundant at Mendel after July 6th. Mr. Nicholson also took it at Digne July 11th-16th, where he mentions that it was partial to the clematis, and lastly, Mr. Norris (*Ent.*, xxv., p. 262) records "two or three only seen of this rare insect, with its peculiar habit of settling like a dragonfly on the summit of a dead twig," at Certosa di Pesio, in July. Mr. Tutt also informs me that he captured in mid-April, 1898, a very fine specimen at Auribeau, near Cannes, and there is a note on its resting-habit in the *Ent. Record*, xi., p. 239. SATYRIDÆ.—*Melanargia galathea* swarmed everywhere, with var. *prociola* much in evidence. *Hipparchia cordula*, one June 27th. *Hipparchia semele*, common. *Pararge maera*, large and bright, some individuals approaching var. *adrasta*. *P. megera*, very frequent. *Epinephele ianira*, large and dark. *Enodia hyperanthus*, on the contrary, struck me as smaller than those met with in our British localities, and I could find no specimens at all of *ab. arete*. *Cocconympha pamphilus*, worn. *C. arcania*, everywhere, flitting in and out of low growing shrubs, while at one point, just below Sta. Maria, I took *C. var. satyrion* flying with it in a marshy meadow. *Erebia ceto*, very generally distributed in the same localities as the last, with *E. stygne* and one or two very brightly marked *E. euryale*, and more rarely *E. tyndarus* with *E. medusa*, all these *Erebia*s evidently making their *debut*.

In conclusion I should say that the characteristic feature of the Rhopalocera, in the Susa district, is the brilliancy of wing-coloration, and the great size of many species, as compared with the representatives of various genera common to the lower Swiss Alps. These features were especially noticeable in the case of *Parnassius apollo* and the Argynnids. But although in these respects specimens differed not a little, I could discover but little variation from the familiar types. Susa itself is a low-lying place, only 1,625ft. above the sea-level, but most of my collecting was done on the higher slopes, and the contrast was, therefore, the more remarkable, and may perhaps be due to the splendid luxuriance of forest trees and vegetation generally. Intent as I was on the day-fliers I gave little time to the Heterocera, but students of the Anthrocerids will find the higher levels teeming with many beautiful species. Meanwhile it is to be hoped that one or other of the steadily increasing band of those who make the Palearctic lepidoptera their especial care, will pay a July visit to the Italian side of the Mont Cenis route. The Albergo di Sole, if not by any means up to the standard of the average Swiss hotel, is better than the run of smaller houses on the Italian side, and the landlord and his wife are most obliging.

Notes on *Luffia ferchaultella* (pomona).

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Amongst the various material which Mr. Tutt has had gathered together this year to elucidate the *Psychidæ*, were cases of species

belonging to the genus to which he has assigned the name *Luffia*, and of which there are at least two species, *lapidella* and *ferchaultella* (*pomonae*). Of these I obtained living cases of the former at Cannes and at Brione near Locarno, and of the latter at Bignasco, in the Val Maggia, as well as empty cases at Cannes and elsewhere, though empty cases must always be somewhat doubtful material. I was also indebted to Mr. Tutt for *L. lapidella*, sent me from Guernsey by Mr. Luff, and *L. ferchaultella*, from Broxbourne, by Mr. Bacot. Unfortunately, leaving home for holiday, I had to hand over this material to Mr. Bacot, and so missed seeing the creatures on emergence; I say unfortunately from my own personal point of view, for Mr. Bacot certainly made more of the material than I could have done. He has now handed me cases and emerged moths, and there arises from their examination one or two points for consideration. Besides the examples had under examination as larvæ, Mr. Bacot also sends me specimens of *ferchaultella* from cases collected by Mr. Fletcher, by Mr. Whittle, and by Mr. Dadd.

The differences between *lapidella* and *ferchaultella*, up to the imago stage, are very trifling, except the notable one of size, *lapidella* being much larger.

In the imago *ferchaultella* has only females (parthenogenetic), and here we find a notable circumstance, that *ferchaultella* from different localities presents structural differences. A more careful examination of a larger series may diminish the absoluteness of these differences, as I found to be the case in differences in the sizes and forms of scales, which I had at first thought to be distinctive of some of these races, but it may also accentuate them. All the forms agree fairly well in the forms and sizes of the chitinous plates of the segments, and in having twelve antennal joints. The great difference is in the number of the tarsal joints.

Those collected by Mr. Fletcher and Mr. Bacot have three tarsal joints to the 1st legs, but four to the other two pairs. These joints are all well-developed and functional, the 1st and 4th long, and two intermediate ones short.

In my specimens from Bignasco the third tarsal joint of the two hinder legs is smaller, very small or evanescent ventrally, and I do not think it is functional in any specimen examined, but is ankylosed to and forms part of the fourth, now become third joint. Sometimes it is difficult to detect it.

In Mr. Whittle's specimens there is no sign of the third joint, there being but three joints to all tarsi, the first and third long, and one short intermediate.

In one specimen from Mr. Dadd, very shrivelled and difficult to examine, there were apparently only three joints to all tarsi, and even the antennæ appeared to have fewer joints, but it would be difficult to assert positively in one such specimen that they had not been broken.

In the specimens collected by Fletcher, Bacot, and Dadd, the scales are broad (as in all *Luffiads*), but not very broad, whilst in those collected by Whittle they are very broad. I at first classed my Bignasco specimens in this matter with Bacot's, but I afterwards found a specimen among them with very broad scales. The scales are always broadest dorsally and on the anterior abdominal segments. In those

specimens with broad scales, some were much like the leaves of *Salisburia adiantifolia* in shape and appearance.

One cannot help speculating on how such racial differences can occur, especially since the curious circumstance appears that Bacot's and Whittle's specimens, from localities not very far apart (Hertfordshire and Essex) are very definitely different, whilst those from south Switzerland are intermediate.

The explanation appears to be that in a parthenogenetic species like this the ordinary effect of frequent crossing in maintaining a uniform aspect of a species in continuous areas has no place. In *L. lapidella*, or any ordinary species, a variation occurring in Switzerland might perchance establish itself, without being affected by type forms existing in England, say Hertfordshire; but if it occurred in Essex, crossing with the Hertfordshire form, directly even, or at any rate through the individuals occurring in the intermediate area, would inevitably result in its being swamped, or, under rare conditions, in its swamping the type; in any case we should find the forms in Hertfordshire and Essex fairly identical (I omit reference to such cases as Mr. Tutt shows us probably occur in *Anthrocera*).

In a parthenogenetic species however, there would be no such crossing; in one locality even, say Essex, a variety occurring would not be swamped by crossing, and it would be purely a question of natural selection, whether the variety or type survived. If the variety was the victor in the struggle then we should have a form in Essex different from that in Hertfordshire, and in a wingless form like *ferchaultella*, it would take a long time for the improved Essex form to invade and eject the type from Hertfordshire. Nor could it succeed in doing this if the type form was, in fact, better adapted to Hertfordshire conditions than the new variety.

Parthenogenesis in fact forms a very effective segregating agency for the formation of new species. The difference between *lapidella* ♀ and *ferchaultella* was probably very rapidly established on the latter becoming parthenogenetic, and the several forms of the latter may or may not be regarded as distinct species very much according to each one's taste or prejudices. Interfertility is certainly not a test applicable to settle any doubt on the question.

(P) RTHOPTERA.

Notes on the Decticidae with descriptions of new species.

By MALCOLM BURR, F.Z.S., F.E.S.

The *Decticidae* are one of the most interesting families of the Locustodea. Strange to say, they have not yet received adequate treatment at the hands of orthopterists and have not yet been monographed. There are nearly 150 species known to science, distributed through 36 genera. At one time they were considered characteristic of the palaearctic region, where certainly they attain their greatest development, but in recent years a considerable number has been taken in the nearctic region. They seem to prefer a temperate climate, for, outside the "holarctic" region, only a few scattered genera, poor in species, are known from South Africa and Australia. They are large and active insects, with powerful jaws, and chiefly

carnivorous in habits. They live among rough herbage and thickets, and are extremely difficult to catch owing to their activity. The male possesses a well-developed stridulating organ, and the ovipositor of the female is long and sword-shaped. Few of the genera contain more than four or five species, though *Thamnotrizon* has 18, and *Platygleis* 32. Some forms are widely distributed, as *Platygleis grisea*, which occurs practically throughout Europe, and others again are extremely restricted in distribution, being confined to small and narrow limits, this being especially the case with many of the mountain-loving forms. They appear to be closely related to the *Locustidae* on the one hand, and to the *Sagidae* on the other. All three families, contain large and powerful insects, with spiny legs and carnivorous habits. The species of *Anabrus*, Hald., are only too well-known in the western states of North America, where they have been known to assemble in great quantities and to do considerable damage. They are known to the Americans as the Western cricket, and reports on their devastations have been published by Packard.

The first systematic work upon the members of the family was that of Herman, who, in 1874, published "Die Decticingen der Brunner von Wattenwyl'schen Sammlung," *Verh. k.k. zool.-bot. Ges. Wien*, Band xxiv., pp. 191-210, Taf. iii-vi. The many European forms were monographed by Brunner von Wattenwyl in 1882, *Prodromus der europäischen Orthopteren*, Leipzig, and the same author has recently (1893) given us a further revision of the genera, "Revision du Système des Orthoptères," *Ann. Mus. Civ. Gen.*, 1893. A. Pictet has described several species from various localities, "Locustides nouveaux ou peu connus du Musée de Genève," *Mém. Soc. Phys. d'Hist. Nat. de Genève*, Tom. xxx., no. 6, 1888. Scudder has also published "A Preliminary Revision of the North American Decticingae," *Canad. Entom.*, vol. xxvi., p. 177, 1894. It may be here mentioned that the historic paper by Brunner, entitled "Disquisitiones orthopterologicae," containing descriptions of many new European species, *Verh. k.k. zool.-bot. Ges. Wien*, Band xi., 1861, Taf. 8-15, is practically embodied in the *Prodromus* of the same author.

The characteristics of the *Decticingae* are as follows:—

Antennae inter oculos insertae; tarsorum articuli bini primi latere longitudinaliter sulcati; foramina tibiæ antice rimata vel conchata; tibiæ anticae spina apicali externa instructæ*; tarsorum posticorum articulus primus plantula libera instructus.

Genus: *GAMPSOCLEIS*, Fieb.

Genus: *GAMPSOCLEIS*, Fieb., 'Kelch. Grundl. zur Kennt.' &c., 5 (1852); Fisch. 'Orth. Eur.', 254 (1853); Herman, 'Decticingae,' p. 201 (1874); Br., 'Prod.', 318 (1882); 'Revis.', (1893). *Locusta*, *Decticens*, auct.

DISPOSITIO SPECIERUM.

- | | |
|---|----------------------------|
| 1. Femora subtus spinulosa. Elytra et alae abbreviatæ. | |
| 2. Species mediocris, europaea; pronoto postice quam antice angustius | 1. <i>abbreviata</i> , Br. |
| 2.2. Species maxima, chinensis; pronoto postice et antice aequè lato | 2. <i>gratiosa</i> , Br. |
| 1.1. Femora omnia inermia. Elytra et alae perfecte explicatæ. | |
| 2. Lamina subgenitalis ♀ emarginata vel sinuata. | |

* Rarely, the external apical spine of the anterior tibiæ is absent, as in *Arytropteris*, which, however, cannot be reasonably placed in any other family.

3. Species parva, europaea; femora postica ovipositorem superantia 3. *glabra*, Herbst.

3.3. Species majores, asiaticæ. Ovipositor femora postica superans.

4. Lamina subgenitalis ♂ lobis obtusis, ♀ sinuata. Ovipositor longus 4. *mikado*, sp. n.

4.4. Lamina subgenitalis ♂ lobis rotundatis, ♀ emarginata. Ovipositor brevis 5. *tamerlana*, sp. n.

2.2. Lamina subgenitalis ♀ recta, nec emarginata. 6. *mutsohito*, sp. n.

TYPE GENERIS: *Gampsocleis abbreviata*, Brunner.

1. *Gampsocleis abbreviata*, Herman, 'Verh. zool.-bot. Ges. Wien,' xxiv., p. 201, tab. iii., figs. 1-7 (1874): Br., 'Prod. Eur. Orth.,' 819 (1882).

Hab.—Dalmatia, Macedonia (Brunner).

2. *Gampsocleis gratiosa*, Brunner, 'Orth. der Reise der Fregatte Novara,' p. 9 (1863); 'Sitzungsber. d. Zool. Bot. Ges. Piet.: Locust. Nouv.,' p. 57, fig. 54 (1888).

Hab.—China (Brunner, Pictet).

3. *Gampsocleis glabra*, Herbst, 'Fuessly, Arch.,' Fasc. viii., p. 193 (1776); Br., 'Prod. Eur. Orth.,' 818 (1882) (where full synonymy is given).

Hab.—Northern and eastern Europe, Prussia, Silesia, Bohemia, Vienna, Hungary, Serbia, Belgium, Ural and on the Volga. For the occurrence of this species at Lanklaer, in Belgium, see de Selys, "Catalogue raisonné des Orthoptères et Neuroptères de Belgique," p. 14 (*Ann. Soc. Ent. Belg.*, xxxii., 1888, p. 116).

4. *Gampsocleis mikado*, sp. n.—Statura majore; colore viridi, vel testaceo, fusco-variegato. Pronotum supra planum et parallelum, haud carinulatum, testaceum, marginibus fuscioribus, lobis deflexis fuscis, marginibus pallidis. Elytra longa, lanceolata, perfecte explicata, testacea, viridi et nigro-maculata, area anali ♂ valde explicata; alæ perfecte explicatæ, hyalinæ, elytris breviores. Pedes testacei; femora omnia inermia. Abdomen testaceum, lateribus infuscatis. Lamina supraanalis ♂ obtuse triangularis, apice vix emarginata; cerci ♂ conici, recti obtusi; lamina subgenitalis ♂ medio triangulariter excisa, lobis obtusis; lamina subgenitalis ♀ sinuata; ovipositor longus, sensim decurvus, apice oblique truncatus, vix vel haud crenulatus. ♂ ♀. Long: Corporis, ♂ 30mm., ♀ 34mm.; pronoti, ♂ ♀ 9mm.; elytrorum, ♂ ♀ 23-5mm.; femorum posticorum, ♂ 27mm., ♀ 29-5mm.; ovipositoris, ♀ 23mm.

Hab.—Japan (coll. mea). This species may be recognised by the form of the anal parts, and by the large development of the stridulating part of the elytra of the male.

5. *Gampsocleis tamerlana*, sp. n.—Statura mediocri. Color ut in *G. mikado*, Burr, a quo differt, elytris alisque paullo longioribus, disco pronoti postice quam antice paullo latiori, carinis lateralibus in metazona subtilissime subexpressis, lamina supraanali ♂ triangulari, medio fissa, cercis ♂ validis, conicis, medio dente magno obtuso interno armatis, lamina subgenitali ♂ lobis rotundatis, ♀ emarginata, haud sinuata, ovipositore breviori. ♂ ♀. Long: Corporis, ♂ 28-5mm., ♀ 33-5mm.; pronoti, ♂ ♀ 8mm.; elytrorum, ♂ 30mm., ♀ 32mm.; femorum posticorum, ♂ 24mm., ♀ 26mm.; ovipositoris, ♀ 16mm.

Hab.—Mongolia, Urga (coll. mea). This is a very distinct species. The form of the anal parts, and especially of the cerci, the shortness of the ovipositor, and the pronotum, in which the lateral carinæ are faintly developed in the metazona, all serve to discriminate it.

6. *Gampsocleis mutsohito**, sp. n.—♂ ignotus. Statura mediocri, pronotum supra planum, carinis lateralibus in metazona subexpressis. Colore viridi, testaceo et fusco-variegato. Elytra et alæ perfecte explicata, illa lanceolata, viridia, nigro-maculata; hæc elytris valde breviores, hyalinæ. Abdomen testaceum, variegatum. Pedes virides, femoribus omnibus inermibus. Ovipositor longus. Lamina sub-

* Nomen Imperatoris japonici.

genitalis ♀ recta, nec sinuata, nec emarginata. ♀. Long: ♀, corporis, 34mm.; pronoti, 10mm.; elytrorum, 24mm.; femorum posticorum, 33mm.; ovipositoris, 26mm.

Hab.—Japan (coll. mea). This specimen, which I received from Mr. O. E. Janson, bears a label in Japanese which I am unable to decipher. The species may be distinguished by the form of the subgenital lamina of the female.



COLEOPTERA.

Coleoptera at Oulton Broad and District.

By E. C. BEDWELL.

It would appear, from the lack of records, that Oulton Broad has not had much attention paid it by coleopterists, and the object of this paper is to emphasize the fact that this is not due to any scarcity of material in the neighbourhood. Perhaps it would be as well if I prefaced my notes by a few remarks on the district. Oulton Broad is situated on the north-east border of Suffolk, about two miles from Lowestoft, it is one of the largest of the now well-known East Anglian Broads, being about a mile long and upwards of 100 acres in extent. On the north and west it is bounded by large tracts of marshes, through which flows the River Waveney; it was in these marshes that most of my collecting was done, few (if any) of my captures being made more than half a mile from some portion of the Broad. The list of species is, I am sure, far from being a complete one of the district, and must merely be looked upon as a list of the species that I have personally taken there during a period of fifteen months, ending early in April, 1899.

Carabus granulatus, L., not uncommon at roots of trees. *Notiophilus biguttatus*, F., common. *N. aquaticus*, L., in flood refuse, not commonly. *Leistus rufescens*, F., under swathes of marsh hay and in flood refuse. *Dyschirius globosus*, Herbst, sparingly in refuse at bottom of marsh hay stacks. *Badister bipustulatus*, F., occasionally in flood refuse. *Oodes helopioides*, F., not uncommon under vegetable refuse in crevices of river wall. *Bradycellus placidus*, Gyll., not uncommon among rejectamenta. *B. verbasci*, Duft., common under stones in sand pit. *Harpalus puncticollis*, Payk., *H. ruficornis*, F., *H. aeneus*, common in sandpit under stones. *H. consentaneus*, Dej., three or four specimens in sand pit. *H. tardus*, Ganz., rarely with the last. *Dichirotrichus pubescens*, Payk., locally abundant under stones and refuse, Lake Lothing side of Broad. *Pterostichus niger*, Schall. *P. vulgaris*, L., *P. nigrita*, F., *P. strenuus*, Panz., common under logs and stones. *P. minor*, Gyll., one specimen in flood refuse. *Amara apricaria*, Sturm., common on blooms of *Cactiss dalia*, in garden. *A. consularis*, Duft., very occasionally in sand pit. *A. spinipes*, Auct., by sweeping. *A. bifrons*, Gyll., and *A. acuminata*, Payk., not common. *A. familiaris*, Duft., abundant. *A. trivialis*, Gyll., and *A. communis*, Thoms., under tufts of grass, &c. *Calathus cisteloides*, Panz., *C. mollis*, Marsh., *C. melanocephalus*, L., *C. piceus*, Marsh., under stones, &c., in sand pit. *Pristonychus terricola*, Herbst, in sheds, &c. *Anchomenus dorsalis*, Müll., under stones. *A. viduus*, Panz., in flood refuse, rarely. *A. albipes*, F., *A. fuliginosus*, Panz., *A. piceus*, L., *A. puellus*, Dej., commonly in flood refuse, &c. *A. gracilis*, Gyll., abundant at foot of a retaining wall and culvert, and occasionally in flood refuse. *A. thoreyi*,

Dej., occasionally in rejectamenta. *Olisthopus rotundatus*, Payk., two specimens under cut grass. *Bembidium obtusum*, Sturm., in flood refuse, rarely. *B. guttula*, F., in moss. *B. aeneum*, Germ., rare, one specimen only. *B. gilvipes*, Sturm., *B. lampros*, Herbst, not common. *B. quadrimaculatum*, Gyll., in moss, &c. *B. bruxellense*, Wesm., one specimen in rejectamenta, the only recorded Suffolk locality. *B. littorale*, Ol., under stones. *Trechus secalis*, Payk., by sweeping, the only recorded Suffolk specimen. *Odacantha melanura*, Payk., common in flood refuse and by sweeping reeds. *Demetrias atricapillus*, L., *Dromius linearis*, Ol., common. *D. agilis*, F., rarely in rejectamenta. *D. meridionalis*, Dej., *D. quadrimaculatus*, L., occasionally, under bark. *D. quadrinotatus*, Dej., common in crevices of oak bark. *D. melanocephalus*, Dej., common. *D. sigma*, Rossi. This species occurs with the last mentioned but is exceedingly local and apparently confined to the roots of sedges at the edge of a short length of ditch. *Metabletus truncatellus*, L., common at the foot of walls, &c. *Haliphus obliquus*, F., one specimen in ditch. *H. ruficollis*, De G., *H. lineatocollis*, Marsh., common in ditches and ponds. *Cnemidodus impressus*, F., rare in ditch. *Noterus claricornis*, De G., not uncommon. *N. sparsus*, Marsh., in ditches, not common. *Laccophilus interruptus*, Panz., *L. obscurus*, Panz., common. *Hyphydrus ovatus*, L., common in ditches and ponds. *Coelambus inaequalis*, F., common. *Hydroporus pictus*, F., *H. lineatus*, F., *H. palustris*, L., *H. erythrocephalus*, L., common. *H. memnonius*, Nic., occasionally in ditches. *Agabus bipustulatus*, L., common in ponds, &c. *Ilybius obscurus*, Marsh., occasionally in flood refuse. *Colymbetes fuscus*, L., not common. *Dytiscus marginalis*, L., common in ponds. *Acilius sulcatus*, L., not uncommon. *Gyrinus natator*, Scop., common. *Hydrobius fuscipes*, L., common in flood refuse, &c. *Anacaena bipustulata*, Steph., common in ditches. *Philhydrus nigricans*, Zett., *Laccobius alutaceus*, Thoms., *L. bipunctatus*, F., common. *Helophorus nubilus*, F., *H. aquaticus*, L., *H. aequalis*, Thoms., *H. affinis*, Marsh., *H. brevipalpis*, Bedel, common in damp places and in brackish ditches. *Ochthebius aeratus*, Steph., not uncommon in ditches. *Cyclonotum orbiculare*, F., several in flood refuse. *Sphaeridium scarabaeoides*, F., *S. bipustulatum*, F., common in stercore. *Cercyon flavipes*, F., *C. melanocephalus*, L., *C. unipunctatus*, L., *C. analis*, Payk., common. *Megasternum boletophagum*, Marsh., abundant in fungi. *Allocharya fuscipes*, F., common. *A. languinosa*, Grav., commonly in marsh hay stacks. *Orypoda alternans*, Grav., common in fungi. *Ocalea castanea*, Er., in vegetable refuse at roots of sedges by side of ditch, uncommon. *Myrmedonia collaris*, Payk., four specimens in damp bottom of marsh hay stack. *Homalota graminicola*, Gyll., in marsh hay stack, not common. *H. circellaris*, Grav., *H. analis*, Grav., *H. trinitata*, Kr., *H. fungicola*, Thoms., abundant in fungi. *H. nigricornis*, Thoms., *H. nigra*, Er., not common. *H. longicornis*, Grav., in marsh hay stack. *H. sordida*, Marsh., common in marsh hay stack. *H. muscorum*, Bris., two specimens by sifting marsh hay. *H. fungi*, Grav., common in marsh hay, &c. *Falagria sulcata*, Payk., *F. obscura*, Grav., somewhat common in marsh hay. *Hygronoma dimidiata*, Grav., by sweeping and in marsh hay. *Hypocyrtus longicornis*, Payk., in flood refuse. *Tachyporus obtusus*, L., by sweeping, &c. *T. chrysomelinus*, L., *T. pusillus*, Grav., abundant. *Tachinus rufipes*, L., by sweeping. *T. subterraneus*, not uncommon in fungi. *Megaronis analis*, F., not

uncommon at roots of alders and poplars. *Mycetoporus splendidus*, Grav., in flood refuse, rare. *Heterothops dissimilis*, Grav., in marsh hay stack. *Quedius mesomelinus*, Marsh., under boards, &c., not common. *Q. fulgidus*, F., under stones, uncommon. *Q. cinctus*, Grav., abundant in stacks of marsh hay, &c. *Q. fuliginosus*, Grav., *Q. tristis*, Grav., common under logs, &c. *Q. molochinus*, under stones and in marsh hay stacks. *Q. maurorufus*, Grav., in marsh hay stack. *Q. scintillans*, Grav., a few in flood refuse. The only recorded Suffolk capture. *Q. semiaeneus*, Steph., in flood refuse. *Creophilus macillosus*, L., crawling along paths, &c. *Ocypus olens*, Müll., common under stones, &c. *O. similis*, F., under stones, scarce. *O. cupreus*, Rossi, under stones in sand pit. *O. ater*, Grav., under stones. • *O. morio*, Grav., not uncommon. *Philonthus splendens*, F., one specimen in stack of marsh hay. *P. laminatus*, Creutz., under stones, etc. *P. aeneus*, Rossi, abundant in manure pit. *P. politus*, F., common. *P. lucens*, Er., one specimen under a sod at the foot of an oak. *P. varius*, Gyll., common. *P. albipes*, Grav., under a board, uncommon. *P. fimetarius*, Grav., common in bottom of marsh hay stacks. *P. sordidus*, Grav., *P. ebeninus*, Grav., *P. sanguinolentus*, Grav., in flood refuse, rare. *P. cruentatus*, Gmel., not uncommon in refuse. *P. discoideus*, Grav., one specimen under a log. *P. nigrita*, Nord., one specimen in rejectamenta. The only recorded Suffolk specimen. *P. trosculus*, Nord., abundant in marsh hay stack, &c. *Actobius cinerascens*, Grav., under reed debris and in stack of marsh hay, rare. *Xantholinus glabratus*, Grav., common in stercore. *X. punctulatus*, Payk., *X. ochraceus*, Gyll., *X. longiventris*, Heer, abundant in flood refuse, &c. *X. tricolor*, F., under stones and flying in the hot sunshine, uncommon. *Othius fulripennis*, F., in moss, not common. *O. laeviusculus*, Steph., *O. melanocephalus*, Grav., under vegetable refuse and by sweeping. *O. myrmecophilus*, Kies, occasionally by sweeping. *Lathrobium elongatum*, L., common, *L. boreale*, Hoch., common in damp places. *L. brunripes*, F., in flood refuse, not common. *Stilicus rufipes*, Germ., abundant in rejectamenta and stacks of marsh hay. *Medon propinqua*, Bris., common in marsh hay stacks. *Lithocharis ochracea*, Grav., in marsh hay stack in December, very rare. *Sunius angustatus*, Payk., abundant. *Paederus riparius*, L., common at roots of willows and in marsh hay stacks. *Stenus bimaculatus*, Gyll., *S. juno*, F., *S. speculator*, Er., *S. bupthalmus*, Grav., *S. canaliculatus*, Gyll., *S. pusillus*, Er., in damp bottoms of marsh hay stacks. *S. crassus*, Steph., in hay stack, not common, together with ab. *littoralis*, Thoms., *S. (?) subaeneus*, Er., in marsh hay stack, very rare. *S. flavipes*, Steph., under stones, not common. *S. binotatus*, Ljun., one specimen whilst sweeping in August. *S. palitarsis*, Steph., common, by sweeping, &c. *S. similis*, Herbst, *S. paganus*, Er., *S. latifrons*, Er., in stacks of marsh hay. *Oxytelus rugosus*, Grav., common. *Hap-loderus caelatus*, Grav., by sweeping. *Lesteva sicula*, Er., abundant in reed refuse; the only recorded Suffolk locality. *Lathrimaenum atrocephalum*, Gyll., *L. unicolor*, Steph., common. *Homalium rivulare*, Payk., abundant in vegetable refuse. *H. caesum*, Grav., in flood refuse. *Anthobium torquatum*, Marsh., abundant on broom in sand pit. *Proteinus ovalis*, Steph., in fungi. *Phloeobium clypeatum*, Müll., not uncommon in damp refuse at bottom of stacks of marsh hay.

(To be concluded.)

PRACTICAL HINTS.

Field Work for November.

By J. W. TUTT, F.E.S.

1.—The eggs of *Thecla w-album* may be found on the twigs of elm, those of *T. pruni* on sloe, and *Zephyrus quercus* on oak, in their respective localities.

2.—The eggs of *Trichiura crataegi* may be found laid along hawthorn and sloe twigs, and those of *Poecilocampa populi* on hawthorn, oak, &c.

3.—On warm evenings many larvæ come out to feed; they are especially numerous on sheltered woodsides, wood-ridings, edges of sandhills, at foot of hedges, &c.

4.—The eggs of *Cirrhoedia xerampelina* hatch from December to February. They should be watched most carefully once November is past.

5.—The larva of *Adela ribulella* lives in a flat case on leaves of *Veronica chamaedrys* (Merrin).

6.—Pupa-digging is by far the most profitable occupation in November—*Smerinthus ocellatus*, *S. populi*, *Tephrosia bistortata*, *Pterostoma palpina*, *Leiocampa dictaea*, *Notodonta siccae*, at foot of willows, salallows, poplars, &c., *Smerinthus tiliae*, at elm; *Drymonia dodonaea*, *Notodonta dromedarius*, *Leiocampa dictaeoides*, *Lophopteryx carmelita*, at birch, &c.

7.—Spun-together birch leaves should be most carefully searched for cocoons of *Endromis versicolor*, *Drepana falcataria*, *Cymatophora duplicata*, *C. fluctuosa*, *C. or*, *Asphalia flavicornis*, &c.

8.—Trunks of birch and alder must be carefully sought for cocoons of *Cerura bicuspis*. (The entomologist who works for this should read Dr. Chapman's article, *ante*, vol. vii., p. 73).

9.—Cocoons of *Cerura furcula* should be searched for on trunks of willow or salallow; those of *C. bifida*, on trunks of poplar; those of *C. rinula*, on salallow, willow, and poplar.

10.—Spun-up poplar leaves should be collected for pupæ of *Clostera curtula*, and those of willows and salallows for *C. reclusa*; those of *Stauropus fagi* are to be found in spun leaves of beech, birch, oak, &c.

11.—Around the base of *Silene* and *Lychnis* plants, pupæ of *Dianthoecia carpophaga*, *D. capsicola*, *D. conspersa*, *Eupithecia venosata*, &c., may be obtained.

12.—Light should be worked for the imagines of *Asteroscopus sphinx*, *Poecilocampa populi* (see notes on this *ante*, vol. i., p. 20), *Himera pennaria*, &c.

NOTES ON COLLECTING, Etc.

LEPIDOPTERA OF BOURNEMOUTH, 1899.—The season in the neighbourhood of Bournemouth, as far as my experience goes, has been fairly good. I started on March 14th and 15th with *Xylocampa lithoriza*, at rest, when the weather changed and I captured nothing until the 27th, when I took another *X. lithoriza*, while *Taenioecampa stabilis*, *T. instabilis*, *T. gothica*, *T. cruda*, *Caradrina cubicularis*, *Pterostoma pal-*

pina, *Eupithecia coronata*, *Clostera curtula*, *Odontopera bidentata*, *Smerinthus populi*, *S. tiliae*, *Leiocampa dictaea*, *Selenia illustraria*, *Dasychira pudibunda*, emerged during May and April, from pupæ found near Cheltenham. Moths taken and bred from this neighbourhood during the same time were *Taeniocampa gracilis*, *Amphidasys prodromaria*, *Hybernia progemmaria*, *Eupithecia pumilata*, *Tephrosia biundularia*, *Thera variata* (larvæ), *Geometra papilionaria* (larvæ), *S. bilunaria*, *Orrhodia vaccinii*, *Chesias spartiata* (larvæ), *Pseudoterpna cytisaria* (larvæ), *Taeniocampa munda*, *Tryphaena fimbria* (larvæ), *Arctia villica* (larvæ), and *Eupithecia nanata*. In May things began to get commoner; day searching produced *Tephrosia biundularia*, and I caught *Eupithecia pumilata*, *E. nanata*, *Filonia atomaria*, *Pachylenemia hippocastanaria*, *Thera variata*, *Smerinthus tiliae*, *Noctua plecta*, *Cyaniris argyrolus*, *Eupithecia rectangulata* (larvæ), *Phytometra aenea*, *S. populi*, *Spilosoma mendica*, *Scodionia belgiana*, *Anarta myrtili*, *Aspilates citraria*, *A. viridata*, *Eupithecia centaureata*, *Panagra petrarum*, *Dyschorista upsilon* (larvæ), *Hemerophila abruptaria*. I did not try sugar or light this month. I took two trips to Brockenhurst during May, but got very little except larvæ, which were scarce. I bred *Aplecta nebulosa*, *Hemitea thymiarum*, *Boarmia roboraria*, *Metrocampa margaritaria*, from them, and took *Ligdia adustata*, *Larentia pertinitaria*, *Tephrosia punctulata*, *Cidaria suffumata*, by "dusking." On May 10th, I took a very nice *Drymonia chaonia*, at rest in my garden, whilst *Cymatophora ocellaris*, *S. tiliae*, *P. palpina*, *Hadena thalassina*, *Axylia putris*, *Amphidasys betularia*, *Leiocampa dictaea*, *Eupithecia isogrammata*, *E. venosata*, *Habrostola triplasia* and *Dianthocia carophaga*, emerged from my Cheltenham pupæ. I bred seven ichneumons from *C. ocellaris* pupæ, and only succeeded in getting eleven perfect insects. During June I worked hard at sugar, light, and during the day. The first named only produced *Aplecta nebulosa*, *Thyatira batis*, *Macaria liturata*, *Xylophasia polyodon*, *Noctua festiva*, *Caradrina morpheus*, *Dipterygia pinastri*, *Mamestra anceps*, *Miana furuncula*, *Rusina tenebrosa*, and *Boarmia repandata*. At light (i.e., moth-trap) I took *Spilosoma menthastri*, *E. nanata*, *Hadena dentata*, *Aspilates citraria*, *Acidalia promutata*, *A. subsericeata*, and at dusk and during the day I took *T. biundularia*, *A. remutata*, *Nemoria viridata*, *Iodis lactearia*, *H. thymiarum*, *Hadena genistae*, *Eupithecia pulchellata*, *A. citraria*, *Arctia villica*, *Sphinx ligustri*, *Cucullia umbratica*, *Phibalapteryx lignata*, *Lobophora rivetata*, *Hepialus lupulinus*, *H. hectus*, *Coremia unidentata*, *Anaitis playiata*, *Acidalia subsericeata*, *A. arersata*, *Hecatera serena*, *Geometra papilionaria*, *Plebeius aegon*, *Lithosia mesomella*, *Eupithecia castigata*, *Melanthia ocellata*, *Pseudoterpna cytisaria*, *Boarmia rhomboidaria*, *Apatela aceris*, *Eupithecia lariciata*, *Endotricha planmedalis* (very common) and *Camptogramma fluriata*. Sugar, light and collecting generally improved during July; at sugar I took *Aplecta nebulosa*, *Noctua festiva*, *Rusina tenebrosa*, (♀s only), *Dipterygia pinastri*, *Thyatira batis*, *Peridroma suffusa*, *Caradrina morpheus*, *Euplexia lucipara*, *Macaria liturata*, *Boarmia repandata*, *Lecania conigera*, *Mima literosa*, *Agrotis* var. *aguilina*, *Gonophora derosa*, *Cymatophora duplaris*, *Tryphaena fimbria*, &c. Dusking and day work produced *Hepialus hectus*, *P. cytisaria*, *Acidalia emutaria*, *P. aegon*, *A. subsericeata*, *Crambus uliginosellus*, *Agrotis porphyrea*, *Acidalia straminea*, *Thymelicus thaumas*, *Anthrocera lonicerae*, *A. trifolii* subsp. *palustris*, *Bryophila glandifera*, *H. serena*, *Crocallis elingaria*, *B. rhomboidaria*, *Crambus perlellus*,

Apamea gemina and *ab. remissa*, *Eupithecia assimilata*, *H. thymiaris*, *Trichilium crabroniforme*, *Leucania impura*, *Melanthia albicillata*, *Platypilia ochrodactylus*, *Eupithecia valerianata* (larvæ), *Melanippe unangulata*, *Miana firuncula* (variable and common), *Eubolia bipunctata*, *Acidalia promutata*, *Cosmotriche potatoria*, *Gnophos obscurata*, *Leucoma salicis*, *Agrotis tritici*, *A. nigricans*, *Anerastia lotella*, *Crambus pinetellus*, *Lithosia complana*, *Selidosema plumaria*, and *Eupithecia subnotata*; while the moth-trap produced *Cidaria dotata*, *Cledeobia angustalis*, *A. dimidiata*, *Arctia caia*, *Cidaria pyraliata*, *Acidalia imitaria*, *A. interjectaria*, *Pelurga comitata*, *P. ochrodactylus*, *Aciptilia baliodactyla*, *L. complanula*, *Agrotis porphyrea*, *A. promutata*, *Halias wavaris*, *Malocosoma neustria*, *Ebulea verbascalis*, *Cilix spinula*, *Eupithecia oblongata*, &c. A couple of trips to Brockenhurst and Lyndhurst produced *Dryas paphia*, *Limnitis sibylla*, *Ellopie fasciaria*, *Argynnis adippe*, *Zephyrus quercus*, *Minea euphorbiata*, *Zonosoma trilinearia*, *Lithosia deplana*, *Apatura iris* 1 ♂, *Calligenia miniata*, *Eugonia polychloros*, &c., while at Swanage I took *Thymelicus actaeon*, *Melanargia galathea*, *Cledeobia angustalis*, *Geometra vernaria*, *Polyommatus agestis*, *Phibalapteryx tersata*, and larvæ of *Eupithecia isogrammata*. During August sugar was no good at all, but honey-dew was very attractive, my best captures being *Caradrina ambigua* (common), *Tethea subtusa*, *Leucania albipuncta* (1), *Tryphaena subsequa* (1) and *Drepana hamula*, while *Tryphaena ianthina*, *T. fimbria*, *Agrotis tritici*, *A. obeliscus*, *A. var. aquilina*, *A. puta*, *A. segetum*, *Hadena chenopodii*, *Miana literosa*, *Peridroma suffusa*, *P. saucia*, *Leucania pallens*, *L. impura*, *Noctua c-nigrum*, &c., were more or less common. Dusk and day work were not much good though I took *Eupithecia subfulvata*, *E. succenturiata*, *Hyphenodes costaestrigalis*, *Crambus latistrius*, *Hydroecia micacea*, *Heptamelus sylvinus*, *Phibalapteryx vitalbata* (1) (no wild clematis near), whilst *Macroglossa stellatarum* was (and is still) common; larva-beating produced *Acrionia leporina* (2), *Notodonta ziczac*, *N. dromedarius*, *Pterostoma palpina*, *Drepana falcata*, *Geometra papilionaria*, &c., and the moth-trap *Ennomostiliaria*, *Eupithecia oblongata*, *Aspilates citraria*, *Acidalia imitaria*, *H. micacea*, *A. emarginata*, *Luperina testacea* (very common and variable), *P. comitata*, *Ebulea verbascalis*, *D. hamula*, *Hemerophila abruptaria*, *Cidaria russata*, *C. latistrius*, *Hyphenastralis* and *Melanthia galiata*. All insects except otherwise mentioned were taken near Bournemouth.—(MAJOR) R. B. ROBERTSON, Boscombe. September, 1899.

NOTES ON LEPIDOPTERA FROM GUERNSEY.—During June and July I was in Switzerland, and so any report from me of Guernsey insects is necessarily only for the dull months of the year. We had nothing but wet and cold until the end of May. There was no spring, and summer came with a rush on May 30th. My first record is January 1st, *Rumia crataegata*, in the house, also *Cheimatobia brunata*. January 25th, *Phlogophora meticulosa*, also in the house, probably an escape from my breeding cage. On February 27th, *Aglais urticae*, flying in the sun within a few yards of a shaded corner, in which the hoar frost had not left the grass at 3.30 p.m. March 14th, *Pararge egeria*, appeared after hibernation; next week we had snow. April 18th, *Pieris brassicae*, and several *P. rapae* with *Chrysophanus phlaeas*, appeared. April 22nd, bred *Dianthoea capsicola*. During April, larvæ of *Dasychira fascelina* were fairly common, but *Lasiocampa trifolii* was very scarce, in fact I only saw three. *Callophrys rubi* not very abun-

dant. *Cyaniris argiolus*, much as usual in spring, but quite exceptionally numerous and fine during August and September. Generally the second brood is very poorly represented here. *Euchelia jacobaeae* appeared on May 12th, which is the earliest date I have observed it. On the 20th I was agreeably surprised to receive a specimen of *Choerocampa celerio*, from Miss Betty Bell, Les Rocquettes. It had been taken in September, '98, in the greenhouse, but not being so large as *Sphinx convolvuli*, which she had caught in some numbers for me at flowers of *Nicotiana*, she thought little of it. It was put aside in a box, and I am very pleased to say was less damaged than might have been expected. It was bred in the island some years ago from larvæ found on the vine. May 28th I bred a specimen of *Dianthoea conspersa*. On my return to the island after my absence for two months I found *Callimorpha hera* very common, with a sprinkling of var. *flavescens*. Up to August 11th males of *Lasiocampa quercis* were very common, and still in fine condition. This is late, in my experience, for this species in Guernsey. I did but little sugaring, and that only in my garden in town, there were no captures of note, and moths generally scarce. *Sphinx convolvuli* was not very common at tobacco plants; I first saw it on August 27th. On August 31st I was somewhat surprised to see *Catocala nupta* flying at nine o'clock in the morning. But the event of the year was the abundance of *Lampides boetica* from September 1st to 15th, after which the wind and colder weather seem to have destroyed them. Somewhat over 100 specimens have been taken in the island, and I could have captured at least 50 more in my own garden alone, only that I left these in the hopes that they might be induced to lay upon the scarlet runner beans which they frequented. Females were very scarce, not, I think, seven per cent. of those observed or captured. I made several attempts to get eggs by caging a female with males and food-stuff, but entirely failed. I have also sown seed of *Colutea arborescens*, both in this garden and country, desiring that future visitors may find provision made for their wants. Many unknown correspondents, in consequence of a letter in the *Standard*, have been most kind in supplying me with this seed. It was to be regretted that a majority of the specimens were certainly undersized, the range of difference, however, was very remarkable. The largest male I took measures exactly 1.50in., and the smallest a trifle under 0.9in. In the case of the females it was much the same, though I had but few to measure—the largest is 1.40in. and the smallest just 1in. in expanse. That some, or even many, were small is not strange, considering the very dry summer, but that others, and several, for I have a nice series, were quite large is remarkable. Mr. Lang gives expanse 1.10in.-1.33in., and Mr. Kane 1.3in.-1.10in. Thus our Guernsey specimens are record sizes. To refer again to other families, on September 7th I received a splendid *Acherontia atropos*, and for the first time heard this creature squeak—it was so vociferous that I nearly dropped it in astonishment. I have also bred four *Dianthoea luteago* var. *lowei* from pupa dug in the spring, and one more *D. conspersa* and four *Gortyna ochracea*. At the end of August I took a few *Caradrina ambigua*, at sugar, not very fresh. I may add that *Pyrameis cardui* and *P. atalanta* have been unusually abundant this autumn, as also has *Macroglossa stellatarum*.—FRANK E. LOWE, M.A., F.E.S. September 30th, 1899.

LEPIDOPTERA AT CHICHESTER.—The first butterfly which I saw this season was *Pieris rapar* on April 20th, and on the 30th of that month *Cyaniris argiolus* was flying in the garden, and continued during May. In the middle of May several *Drepana cultraria* (*unquicula*) were taken in a plantation near Goodwood. At the end of the month and during June *Chariclea umbra* (*marginata*), *Emmelesia affinitata*, *Callimorpha dominula*, *Asthena luteata*, *Melanippe procellata*, and *Spilodes verticalis* made their appearance. In July *Anticlea rubidata*, *Geometra vernaria*, (*G. papilionaria*), *Lithosia griseola*, and *Cyaniris argiolus* were taken. Captives at sugar comprised in June *Miana strigilis*, *Agrotis corticea*, *Hadena dissimilis* (*suasa*), *Xylophasia hepatica*, and *Rusina tenebrosa*. During July a fine lot of *Calymnia affinis* and *Hecatera serena*, *Tryphaena interjecta*, *T. jimbria*, and in August *Bryophila muralis* (*glandifera*). *Macroglossa stellatarum* was undoubtedly the moth of the season, many visiting the gardens daily, whilst the butterfly *par excellence* was *Pyrameis atalanta*. *P. cardui* was quite common in July, and remarkably rosy. All my captures of this butterfly were beaten from a hedge in the evening.—JOSEPH ANDERSON, Alre Villa, Chichester.

AVENTIA FLEXULA AT CHICHESTER.—I had the pleasure of taking a fine specimen of *Aventia flexula*, which I beat out of a hedge on July 12th and another from the same place on the 18th of that month.—**IBID.**

ENNOMOS AUTUMNARIA (ALNIARIA) AT CHICHESTER.—I took two specimens here of this insect, one at light on September 7th, and another—a worn female—which flew into the house on October 3rd.—**IBID.**

ACHELONTIA ATROPOS AND MACROGLOSSA STELLATARUM AT DOVER.—On visiting a friend at Dover on October 8th I was agreeably surprised to find a ♀ *A. atropos* waiting for me. It had been taken the previous Friday evening outside the garden door and was in very fair condition. I might also record that I took a good number of *M. stellatarum* at Dover on September 9th, where it appeared to be as abundant as elsewhere.—V. E. SHAW, 8, Moss Hall Grove, North Finchley, N. October 12th, 1899.

LEPIDOPTERA AT BURNLEY.—In continuation of my notes (*ante*, p. 274) I have to state that on September 11th, I obtained three *Oporabia filigrammaria* from the moors, two resting on rocks, and one, a female, on heather (the latter laid a few eggs), but it appears to have been scarce this year. On October 8th my attention was called to a "buzzard," which proved on examination to be a fine *Sphinx concoloruli* in splendid condition. It was sitting on a stone wall, just within the window coping.—W. G. CLUTTEN, 10, Hallwell Street, Burnley. October 18th, 1899.

PAEDISCA SOLANDRIANA.—ERRATUM.—In my note (*ante*, pp. 275-7) there is an error for which the printer is, I believe, wholly responsible. Six lines from the bottom of p. 276, the following appears:

"Dusking, in the same district, produced *Peronea schalleriana*, *aspersana*, and *variegana* and *Paedisca solandriana* larvæ were beaten very freely from birches; isolated stunted bushes in damp parts of the moors being the most productive."

What I have very little doubt I wrote was:

"Dusking, in the same district, produced *Peronea schalleriana*, *aspersana* and *variegana*, and *Paedisca solandriana*. Larvæ were beaten very freely from birches; isolated, stunted bushes in damp parts of the moors being the most productive."

Then follows a list of the larvæ. You will see that, as the note

appears, I am credited with taking *P. solandriana* in the larval state in August, whereas it is feeding in May and flying in August.—F. H. DAY, 6, Currock Terrace, Carlisle. *October 18th, 1899.*

SATURNIA PAVONIA PASSING TWO YEARS AS PUPA.—Referring to the note (*ante*, p. 280), we have several times had *S. pavonia* pass two years in the pupal stage.—(Mrs.) M. E. COWL, 42, Spencer Park, Wandsworth Common, S.W. *October 18th, 1899.*

PORTHETRIA DISPAR AT SANDGATE.—It will, I think, interest your readers to know that on August 3rd, 1899, a male *Ocneria dispar* flew to light in a bed-room of a house I had taken at Sandgate. It is a good specimen, and is now in my collection.—JOS. F. GREEN, West Lodge, Blackheath. *October 19th, 1899.*

ACHERONTIA ATROPOS IN YORKSHIRE.—In August, 1898, a larva of *A. atropos* was taken at Staithe, which pupated in September, it went through the winter in a cool place, and emerged on July 14th, 1899. I also had a single larva brought to me on August 23rd (full grown), taken off potato at Thornaby, this went down on August 27th, and has not emerged yet, although put in a warm place.—T. A. LOFT-HOUSE, The Croft, Linthorpe, Middlesborough. *October 24th, 1899.*

MACROGLOSSA STELLATARUM IN YORKSHIRE.—*M. stellatarum* has occurred all over the Middlesborough district, as in other parts of the country this year. The first noticed in this district by me was a single specimen on June 4th, at Thornaby, whilst on June 10th I noticed two or three dashing about over moors, near Great Aytton and observed another (in one instance the moth hovering over a wall in the sun). The next specimen was noticed in our garden at Linthorpe, Middlesborough, on August 23rd, and on September 1st, in both cases hovering over phloxes. I also heard of specimens being noticed during August at Redcar and Bilsdale, whilst yet another specimen was noticed hovering over wall in sunlight at Linthorpe, Middlesborough, on September 9th, about 9 a.m.—*IBID.*

POLYOMMATUS CORYDON IN ESSEX.—As there appear to be no recent records of *Polyommatus corydon* occurring in Essex, it may be as well to mention that I detected a specimen of this butterfly in a box of Lepidoptera collected during the past summer at Havering-atte-Bower. The example is a small male, and was taken by Miss Gertrude Pemberton-Barnes.—B. A. BOWER, F.E.S., Lee. *October 17th, 1899.*

AGROTIS PUTA IN MAY AND JUNE.—I find that I have May and June records of this species from the Bristol district, in 1887 and 1890. It seems to be regularly double-brooded there, but usually more abundant in August and September than in the spring.—R. M. PRIDEAUX, Reigate. *October 19th, 1899.*

DIANTHOECIA CONSPERSA AND EUPITHECIA VENOSATA FROM OBAN.—During the past summer I have bred about two dozen specimens of *D. conspersa* from capsules of *Silene maritima* collected at Oban the preceding year, they are of the ordinary southern type. Collected with them, at the same time, were a few larvæ of *Eupithecia venosata*, the resultant imagines were likewise most disappointing, being exactly similar to specimens in my collection from North Devon, bred from the same plant. It is of course well known that *E. venosata* bred from this plant are slightly darker than those from the usual inland food-plant, *Silene inflata*, but otherwise typical.—W. G. SHELDON. *September, 1899.*

CARADRINA AMBIGUA IN JUNE.—Whilst staying in South Devon, at the end of last June, I sugared several times. The only notable species captured, was *Caradrina ambigua*, of which a few worn specimens appeared. It is, of course, known that the insect is double-brooded in the Isle of Wight, but I do not remember that a June brood has been recorded from Devonshire.—*IBID.*

ACHERONTIA ATROPOS IN KENT.—I took a fullfed larva of *A. atropos* from a potato field at Broadstairs, on August 24th last. It went to earth two days afterwards.—A. RUSSELL, F.E.S., Southend, near Catford, S.E.

COLIAS HYALE IN KENT.—I saw and took *C. hyale* in good condition, in the neighbourhood of St. Peter's, at the end of August last.—*IBID.*

NOCTUA CASTANEA AT READING.—It may be of interest to record that I captured *Noctua castanea* here, at sugar (August 30th), two examples being of the ab. *neglecta* and one of ab. *levis*. This last month, September, has been the worst in all my experience for sugar, the unusual cold, probably, was the cause; not even the commonest things turned up—four *Tiliacea aurago* and two *Epunda lutulenta*, being the only good things taken all the month.—W. E. BUTLER, Hayling House, Oxford Road, Reading.

CAPTURE OF DIANTHOECIA VAR. BARRETTII IN NORTH WALES.—It may be interesting to your readers to know that I captured two specimens of *D. var. barrettii* in North Wales this year, one on June 4th, the second on June 8th.—F. C. WOODFORDE, Market Drayton, Salop. October 1st, 1899.

PORTHESIA CHRYSORRHOEA LARVÆ AT FELIXSTOWE.—On July 7th and 10th last, my brother, who was staying at Felixstowe, sent me some larvæ he had found feeding on bramble. They proved to be *P. chrysorrhoea*, and early in August eight nice imagines emerged from the pupæ.—A. RUSSELL, F.E.S., Southend, Catford, S.E. October 31st, 1899.

LATE EMERGENCES OF PYRAMEIS ATALANTA AND AGLAIS URTICAE.—On September 12th last I took, at Southend, near Catford, about a dozen and a half larvæ of *P. atalanta*, the majority of which were nearly full-fed and pupated shortly afterwards. The imagines commenced to emerge from the pupæ on October 20th, and continued to do so till the 30th of that month. Practically the whole of them emerged in perfect condition and were of the usual form. On September 5th I took a nest of very small *A. urticae* larvæ at Sandwich. These pupated at the end of September, somewhat small in size. The imagines commenced to emerge on October 26th, and continued to do so until the 3rd of that month. They were darker in form than the ordinary type, and this particularly applied to the reverse of the hind wings. Both the *P. atalanta* and *A. urticae* on emergence were very sluggish, and disposed to hibernate at once.—*IBID.*

LEPIDOPTERA AT ANGMERING, SUSSEX.—*Acherontia atropos* was fairly common in the neighbourhood of Angmering, Sussex, this autumn. I had seven pupæ, from which I obtained five perfect imagines. *Macroglossa stellatarum* was exceedingly common, hundreds might have been taken. I observed this insect to be attracted by colour as well as perfume—or rather without perfume—for it was seen not a few times, and captured, while hovering at the gaily painted tops of the croquet

sticks standing in the turf. Sugar was not good—ivy bloom far better. Three times I found larvæ feeding at sugar. Once the larva of *Cosus ligniperda*, once that of *Hadena oleracea*, and lastly that of *Spilosoma lubricipeda*. This incident of larvæ feeding at sugar is a novelty to me. *Pyrameis atalanta* was seen in great numbers.—J. C. DOLLMAN, Hove House, Newton Grove, Bedford Park, W. October 30th, 1899.

REARING *LEUCANIA ALBIPUNCTA* FROM OVA.—I have much pleasure in recording a successful attempt to breed *Leucania albipuncta*. The ova were laid by a female taken at sugar in the Isle of Wight, on August 18th last. The larvæ hatched on August 29th. Nearly half of them fed up rapidly, and by October 5th had retired below the surface of the earth provided for them, the remainder of the brood are still slowly feeding up, and are mostly in their last skin but one. The perfect insects are now emerging, the first one came out on October 26th. The brood has been kept in a room where there is a fire every day. Also I might mention that the pupæ were left undisturbed and the surface of the earth was not damped.—H. H. MAY, Redlands, Hillbury Road, Upper Tooting, S.W. November 2nd, 1899.

PORTHESIA CHRYSORRHOEA AT SANDGATE.—It may interest you to know that at Sandgate this year, July 30th, I netted two *Porthesia chrysorrhoea* that flew to light in our drawing-room, and a third on August 4th. All three were ♀s.—JOS. F. GREEN, West Lodge, Blackheath. November 3rd, 1899.

CURRENT NOTES.

A bronze memorial medallion portrait of the late Henry Ulyett, B.Sc., F.R.G.S., author of that charming little volume "*Rambles of a Naturalist round Folkestone*," has lately been placed in the Folkestone Museum, which he practically founded, and where so much of his scientific work still remains.

At the meeting of the Ent. Soc. of London, held on October 4th, 1899, the President announced the death, at the advanced age of 86 years, of Mr. Hippolyte Lucas, an Honorary Fellow of the Society. He gave a brief account of the career, and eulogised the work, of the distinguished French entomologist. He also announced the death of Mr. Samuel Stevens, and, in reference thereto, said the Society had to deplore the loss of one of its oldest and most highly esteemed Fellows. Mr. Stevens was formerly for many years Treasurer, and had also been a Vice-President, and during the whole period of his long connexion with the Society had always shown the greatest interest in its welfare. That this interest had up to the last continued unabated was manifested by the terms of his will, in which he had made a bequest of £100 to the Society.

At the same meeting, Mr. J. J. Walker exhibited, on behalf of Mr. E. G. Bayford, a specimen of *Galerita bicolor*, Drury, a North American beetle of the family Carabidæ, said to have been taken many years ago at Doncaster. He also exhibited a remarkable variety of *Aglais urticae*, L. (*ichnusoides*, De Selys), which was captured in the Isle of Sheppey on August 28th, 1899.

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Three seasons among Swiss Butterflies.

By G. WHEELER.

Whilst the number of English lepidopterists working (or playing ?) from time to time in Switzerland increases annually, a growing experience convinces me that few know how much may be done in a comparatively short time, even by those who are hampered by "Doctor's orders," and to whom steep climbs, stern chases, and really long walks are simple impossibilities. As I have succeeded during the last three seasons, even with these drawbacks, in collecting 146 different species of butterflies, or including named varieties 182, of which all but four species have been taken by myself, it seems not impossible that some account of the times and places of their capture may prove of interest to Anglo-Swiss collectors. With the exception of two species, one at least of which (*Lycaena arcas*), if not both, may be taken in the neighbourhood of Montreux, the whole collection was taken in the cantons of Vaud and Valais, *i.e.*, in the lower Rhone valley and its neighbourhood, and the number of species which these localities afford is even then by no means exhausted.

The nucleus of my collection was formed at Veytaux, near Chillon, between the 6th and the 21st of April, 1897, and the hunting-ground was confined to a few fields in the immediate neighbourhood of the village. The species taken at this time were *Pieris rapae*, *P. napi*, *Euchloë cardamines*, *Gonepteryx rhamni*, *Callophrys rubi*, *Polyommatus agestis*, *P. icarus*, *Nomiades semiargus*, *N. cyllarus*, *Cupido minina*, *Euranessa antiopa* (hybernated, but in splendid condition), *Coenonympha pamphilus*, *Syrichthius alveolus* and *Nisoniades tages*. *N. cyllarus* was so abundant that I hastily concluded that it was a very common species, an idea which the experience of two later seasons has greatly modified, if not reversed; among the specimens was a ♀ much suffused with blue on the upper side, the only blue ♀ I have as yet seen.

On April 21st a move was made to Chièvre, near Bex. At the back of the Pension Mœsching, which stands on a hill in the midst of splendid walnut and chestnut trees, was a field of dandelions (grown here as food both for man and beast), which was very prolific in *Papilio machaon*, and produced also an occasional *P. podalirius*. The fields and lanes in the neighbourhood produced, in addition to the species taken at Veytaux, *Aporia crataegi*, *Chrysophanus dorylis*, *Polyommatus dorylas*, *Nemeobius lucina*, *Argynnis lathonia*, and on May 16th one specimen of *Erebia medusa*.

May 17th took us a mile and a half further on to the village of Lavey, not far from St. Maurice, which became our head-quarters until the 1st week in June. During this time a considerable increase in the number of species took place. *Colias hyale* became very common and a very scanty spring brood of *C. edusa* appeared. Here too was found my first really good "take," a pair of *Anthocaris belia* var. *ausonia*, the ♀ of which is rare. It is a very rapid and strong flier, so that luck and a fair certainty of aim are required for its capture; I saw only one other specimen. All the species taken at Veytaux and Chiètre were still to the fore, and, in addition, *Polyommatus bellargus* and *Melitaea cinria* were to be met with commonly at the foot of the cliffs, and *Brenthis euphrosyne*, a little higher up. Shortly before leaving Lavey specimens of *M. dictynna* and *B. ino* were secured, whilst *Enodia hyperanthus* and *Epinephèle janira* became very abundant just below the village. A visit to Veytaux on May 26th and 27th was productive of *Lycaena arion*, *Coenonympha arcania*, *C. iphis* and *Spilothyrus althaeae* and a walk from Roche station across to the Rhone, at the splendid old covered bridge at Chessel, added *Plebeius argus*, which was very abundant on the masses of flowers covering the river bank. To this period also belongs a specimen of the wholly white ab. *erysimi* of *Leucophasia sinapis*, which was afterwards unfortunately broken, but which I was lucky enough to replace by a far finer specimen taken at Veytaux in the following August.

June 3rd found us back at our old quarters at Veytaux, where we remained until the 14th. Here *Chrysophanus chryseis* fell to my net as well as *Plebeius argon*, *Polyommatus cumeleon*, *Limenitis camilla*, and *Pararge egeria*; and an ascent (by rail) to Caux added to these *Melitaea artemis*, *M. athalia*, *Erebia oeme*, *Pararge macra*, and *C. arcania* var. *darwiniana*. On June 18th at Veytaux I took *P. deianira*, one specimen only, and also a single specimen of *Limenitis populi* var. *tremulae*, which is still among my chief prizes. From June 14th to the 21st we took up our abode at Caux, but as rain and clouds were almost incessant, no new species except *Aglais urticae* were to be had; a few specimens of species previously obtained (including *C. chryseis*, *L. arion*, &c.), being the entire capture.

On June 23rd we again left Veytaux for le Sépey, some seven miles above Aigle, where we intended to pass a considerable part of the summer. Here, on the upper part of the road between Sépey and Aigle, I took, during the last week of June, *Parnassius apollo*, *Thecla ilicis*, *T. prini* (one somewhat worn specimen only), *M. didyma* (♂ only), *Brenthis amathusia*, *Melanargia galathea*, *Satyrus hermione*, *Spilothyrus althaeae* and *Thymelicus lineola*, and just above Sépey *Carterocephalus panicus*; and during the 1st week of July *Thecla spini*, *P. corydon*, *P. damon* (♂s only), *L. camilla*, *Eugonia polychloros*, *Satyrus cordula*, *Spilothyrus laraterae*, and three somewhat worn specimens of *Apatura iris* (two ♂ and one ♀). On the hill immediately behind Sépey I also took specimens of *L. arion*, *Argynnis aglaia*, and *A. niobe* var. *eris*, and on July 9th three specimens of *Colias phicomone*, all ♂s. *Pieris brassicae* swarmed in the village itself. One other butterfly I cannot refrain from mentioning, though I never caught it myself, viz., *Dryas pandora*. One day during our stay at Sépey much excitement was caused us by the arrival of kindred spirits in the persons of the Rev. F. E. and Mrs. Lowe, the former of whom took a first rate specimen

of this splendid fritillary near Aigle on July 5th, which he was kind enough to lend to me to paint from before it was set. This butterfly is usually found in very warm localities, but M. le Chanoine Favre of Martigny (of whom more anon), has shown me a specimen in his collection taken not far below the hospice on the Grand St. Bernard. This latter specimen is remarkable for the extreme paleness of its colouring.*

Our intended stay at Sépey was cut short on July 14th, our locality being changed (by doctor's orders) for the Baths of Aigle—an excellent hunting-ground, but steamy in July, and much frequented by mosquitos, as indeed is the whole of the lower Rhone valley except *Sierre* and *Brigue*. Here *T. spini* and *T. ilicis*, together with its var. *cerri*, were still to be found, though somewhat worn; *T. u-album* was fresh on July 22nd but worn by July 28th. These are to be found both on the old and new roads from Aigle to Sépey; the latter is the sunnier in the morning, the former in the afternoon. *Zephyrus quercus* came out in the middle of July, and is to be found in the wood on the Olon road near the Grand Hôtel, as well as on the new Sépey road. In the same wood *L. sibylla* was common, though mostly rather worn, a remark which applies equally to *Erebia ligea* and *Pararge deianira*. *Polygonia c-album*, *Dryas paphia*, *Argynnis adippe*, and *Pararge megaera* were abundant, *Vanessa io* fairly common, and a few specimens of *D. paphia* var. *valesina* were also forthcoming. *Pamphila sylvanus* and *Thymelicus thauinas* were common, and I took a single worn specimen of *Chrysophanus virgaureae*. An expedition to Lavey on July 24th produced *P. damon* ♀, *Satyrus semele*, *S. cordula*, and *S. phaedra* (♂s only). At the beginning of August, *Erebia aethiops* appeared, together with its var. *leucotaenia*, the former being very abundant, and at the same time I took one specimen of *Zephyrus betulae*. It will be seen that the road between Aigle and Sépey is much frequented by the Theclids, which congregate in numbers on a species of elder-bush which grows ordinarily to the height of the shoulder or somewhat taller, its straight stalks being each crowned by a flower smaller but more solid than that of the common species. A single specimen of *Cupido sebrus*, ♀, belongs, I believe, to the Aigle list, but as no note was made of it at the time, it may possibly have been taken at Veytaux, where I have since captured this species.)

August 5th was spent at Brigue, where the second brood of *Colias elusa* had already appeared; the only new capture at this time was *Brenthis dia*. On the 6th we went to Bérisal, where I had the pleasure of making acquaintance with an enthusiastic entomologist, Dr. Coulon, physician to the Prince of Monaco, from whom I obtained much valuable information as to localities in this neighbourhood, which he visits annually. Many of the commoner species, and others with which, though not very common, I was already well acquainted, were to be found here in some numbers, such as *P. apollo*, *C. hyale*, *P. argus*, *P. aegon*, *P. agestis*, *P. icarus*, *P. damon*, *P. bellargus*, *P. dorylas*, *P. corydon*, *P. eumedon*, *N. semtargus*, *C. minima*, *M. didyma*, *B. euphrosyne*, *A. lathonia*, *A. aglaia*, *M. gylathea*, *S. hermonie*, *S. semele*, *P. moera*, *P. megaera*, *C. pamphilus*, *S. lavaterae*,

* We saw a very fine example on August 18th, 1899, in the gardens bordering the lake at Lausanne.—ED.

S. alveolus and *T. thaumas*; and, in addition to these, I took the following species, whose places had hitherto been blank in my collection—*C. virgaureae* and its ♀ var. *zermattensis* (the only form of the ♀ found in this valley), one very dilapidated specimen of *C. alciphron* var. *gordius*, one specimen of *C. phlaeas*, *Polyommatus baton* (a few), *P. orbitulus* (one ♂ only at the top of the Simplon pass), *P. donzelii* (two specimens, both ♂s), *Pyrameis cardui*, *M. artemis* var. *merope* (one ♂ at the top of the pass), *M. parthenie* var. *varia*, *M. didyma* ♀ var. *alpina* (the only form I saw for two years), a single torn specimen of *Brenthis pales*, *Melampias melampus* (abundant, but worn), *Erebia tyndarus*, *E. goante*, *E. euryale* and var. *adyte* (all abundant), *Epinephele lycaon* (the ♂ of which was somewhat past), *C. satyrion* (at the top of the pass, a form I have not since met with), *Syrichthus sao*, and *Pamphila comma* (the latter very abundant). (At some time during this season I took one specimen of *Coenonympha darus*, of which I have unfortunately no note, nor have I seen the species since.)

The weather having become very cold we descended, on August 27th, to Brigue, where we renewed acquaintance with *B. dia*, and my wife netted an enormous specimen of *Papilio machaon*, which measures 3½ ins. in expanse—a record I fancy—and the following day returned to Veytaux, where *Z. betulae* and *B. dia* were still very busy, and *Pyrameis atalanta* abundant. *C. hyale* and one or two of the Vanessids were frequently to be seen for six or seven weeks, and *C. edusa* remained with us till December.

During this first season I had, therefore, taken the following 113 species and varieties (not including *C. gordius* and *B. pales* which were too bad to put into a collection)—*P. podalirius* and *P. machaon*, *P. apollo*, *A. crataegi*, *P. brassicae*, *P. rapae* and *P. napi*, *A. belia* var. *ausonia*, *E. cardamines*, *L. sinapis* and var. *crysini*, *C. phicomone*, *C. hyale* and *C. edusa*, *G. rhamni*, *Z. betulae*, *Z. quercus*, *T. spini*, *T. r-album*, *T. ilicis* and var. *cerri*, *T. pruni*, *C. rubi*, *C. virgaureae* ♂ and var. ♀ *zermattensis*, *C. chryseis*, *C. dorilis*, *C. phlaeas*, *P. aegon*, *P. argus*, *P. baton*, *P. orbitulus*, *P. aegestis*, *P. icarus*, *P. bellarius*, *P. dorylas*, *P. corydon*, *P. damon*, *P. donzelii*, *P. eumedon*, *C. argiolus*, *C. sebrus* ♀, *C. minima*, *N. semiargus*, *N. cyllarus*, *L. arion*, *N. lucina*, *A. iris*, *L. sibylla*, *L. camilla*, *L. populi* var. *tremulae*, *P. c-album*, *E. polychloros*, *A. urticae*, *V. io*, *E. antiopa*, *P. atalanta*, *P. cardui*, *M. artemis* and var. *merope*, *M. didyma* ♂ and var. ♀ *alpina*, *M. cinxia*, *M. parthenie* var. *varia*, *M. dictynna*, *D. paphia* and var. *valesina*, *A. aglaia*, *A. adippe*, *A. niobe* var. *eris*, *A. lathonia*, *B. euphrosyne*, *B. amathusia*, *B. dia*, *B. ino*, *M. galathea*, *M. melampus*, *E. oeme*, *E. medusa*, *E. tyndarus*, *E. goante*, *E. aethiops* and var. *leucotaenia*, *E. lixys*, *E. euryale* and var. *adyte*, *S. hermione*, *S. semele*, *S. cordula*, *S. phaedra* ♀, *P. megera*, *P. maera*, *P. egeria* and *P. achine* (*deianira*), *E. hyperanthus*, *E. janira*, *E. lycaon*, *C. iphis*, *C. pamphilus*, *C. darus*, *C. arcania* var. *darwiniana*, *C. satyrion*, *S. althaeae*, *S. lavaterae*, *S. alveolus*, *S. sao*, *T. thaumas*, *T. lineola*, *P. sylvanus*, *P. comma*, *N. tages* and *C. paniscus*—no mean take.

The season of 1898 was an unusually late one, much of the spring being wet and cold, and, while many of the species which I had taken in Veytaux in 1897 were in their former haunts, the better kinds, such as *Chrysophanus chryseis*, *N. cyllarus*, *P. eumedon*, *L. arion*, *L. camilla*, *L. var. tremulae*, *P. achine* (*deianira*), *C. arcania*, and *C. iphis* were conspicuous

by their absence. One specimen of *E. melusa* was taken at Roche at the end of May, and it appeared again at Caux at the beginning of June, when *M. parthenie* was also to be found there; at the same time I found that the aberration of *P. icarus* without basal spots on the underside of the forewings (*icarinus*) was by far commoner than the type in the field forming the gorge of the Veraye behind Veytaux, but no new species had been acquired up to the time of my departure for Mont Barry, near Gruyère, on June 22nd. Here bad weather and bad health entered into a compact to prevent my working this (to me) new district, but I obtained two new species *L. euphemus* and *L. arcas* (*erebus*), both of which were very common in the damp fields behind the small hill on which the hotel is built, where *C. chryseis* and *M. dictynna* were also abundant. *E. ligea* appeared just before our departure for Bérisal, where we arrived on July 8th. The whole interest of this year's captures centres round Bérisal, where we remained until August 30th, except during one week of August, spent in the new hotel on the top of the Simplon pass. *P. mnemosyne* was very abundant just behind the hotel for some ten days after our arrival, and at the same place *P. napi* var. *bryoniae* was by no means uncommon; for both these the lateness of the season was to be thanked. One specimen of *P. hiera* I found, but too worn to be set. In Kane's generally excellent little book I find July and August given as its time of appearance, but even in a late season the second week in July is too late, and in an early season, as I found in 1899, it is quite over before the end of June. I took an early opportunity of searching at the second refuge for *L. cephyrus* var. *lycidas*, which I found in abundance in the fields above the refuge, but it is a mistake to suppose that it is confined to this spot, as I have taken it at intervals by the road-side as far as the Ganter bridge. It was while hunting *lycidas* that I had the good fortune to fall in with that excellent and indefatigable lepidopterist Chanoine Favre, of Martigny, and still more fortunate was I to be able to offer him specimens of *lycidas* and to put him on the track of obtaining them for himself; for he has since proved himself a most kind friend, and is always ready to impart to me his stores of wonderfully accurate information. At the same time as *lycidas*, *P. escheri* (*agestor*) and *M. phoebe* were very abundant by the road-side between the second refuge and the Ganter bridge, at which latter spot *P. argus* and *P. aegon* swarmed somewhat later in incredible numbers, a few specimens of *P. argus* var. *aegidion* being found among them. Two specimens of *A. belia* var. *simplonia* fell to my lot this month. It seems to be often confounded with var. *ausonia*, but the latter, especially the ♀, is a far sturdier and more robust-looking insect; the discoidal spot of *ausonia* is larger and there is much more white on the underside of the hindwings. A few specimens of *Pieris daphidice* were also to be taken. In the middle of July *Colias phicomone* appeared near the fifth refuge, and continued to be abundant for more than a month. At the same time I took one specimen of *Erebia evias* at the Ganter bridge, and at the same spot *E. ceto* appeared in tolerable numbers, but entirely disappeared before the end of the month. At the top of the pass I took *E. lappona* commonly, also in the middle of July; and at the fourth refuge several specimens of *Æneis aëlla* during the last ten days of the month. During this time and the beginning of August *Brenthis pales* was abundant, and the var. *arsilache* fairly so, both at the fifth refuge and at the top of the pass; and at the begin-

ning of August *Argynnis niobe* (type) was in considerable numbers above the fourth refuge—the var. *eris* is abundant everywhere on the mountains. A day at Visp at the beginning of August produced nothing new, an excellent specimen of *D. paphia* var. *valesina* being the only thing worth mentioning. The genus *Chrysophanus* is well represented at and around Bérisal. From the last week in July *C. virgaureae* with var. *zermattensis* is in great abundance, *C. chryseis* var. *eurybia* is to be taken at the same time, though not very abundantly, from the Ganter bridge to the fifth refuge; throughout most of July and the beginning of August *C. alciphron* var. *gordius* is abundant near the Ganter bridge and extends its range to the fourth refuge; I also took one specimen of the type near the second refuge; *C. dorilis* is occasionally found, and in 1898 *C. phlaeas* was very abundant, and I took one specimen of the dark and tailed var. *cleus*. Up to this time I had only seen one specimen of *C. phlaeas*, and though I have since found a few specimens in various localities, I am inclined to consider it as by no means common in Switzerland, at any rate in and about the Rhone valley, an opinion in which Dr. Coulon concurs. But if the Chrysophanids are well represented, what shall I say of the Lycaenids? I have already mentioned *P. lycidas* and *P. aegestor*, and the incredible numbers of *P. aegon* and *P. argus*, and last year's list gave also *P. icarus*, *P. aegestis*, *P. damon*, *P. bellarius*, *P. dorylas*, *P. corydon*, *P. eumedon*, *Nomiades semiargus*, *C. minima*, *P. baton*, *P. orbitulus* and *P. donzelii*. All these, except *P. baton*, were represented in 1898, though *P. icarus* was not very common, *P. eumedon* very scarce, whilst of *P. donzelii* I found only a single specimen; but all the rest were exceedingly abundant, often many kinds would congregate in numbers on moist places in the road, and presented a vision of beauty never to be forgotten. Nor is this all, for, in addition to *P. lycidas* and *P. aegestor*, I took five other species and varieties, viz., *P. pheretes*, *P. optilete*, *P. eros*, *L. alcon*, and *L. arion* var. *obscura*. Of these, *P. pheretes* is to be found close to the fifth refuge, where I took a few ♂s on various days at the end of July; (the ♀ I have never seen, and I find that native entomologists consider it very scarce); of *P. optilete* I have taken single specimens at the fourth and fifth refuges, and at the top of the pass at the end of July and the beginning of August, but all these were slightly worn; *P. eros* appeared below the fourth refuge on August 6th, and became common just beyond the fifth refuge by the 12th, the ♀ appearing a few days later; of *L. alcon* I took one ♂ and four ♀ specimens, all in the neighbourhood of the fourth refuge, and soon after my arrival, whilst *L. arion* var. *obscura* was common during most of my stay from the second refuge upwards. *P. orbitulus* of which I had only taken one specimen in 1897 was abundant on the Steinen-alp at the beginning of August, and not uncommon at the top of the Simplon pass at the end of July. There are thus no less than 22 species and varieties of this tribe to be found in the course of a month between the second refuge and the top of the pass; or indeed 23 for I have seen splendid examples of *C. minima* var. *alsoides* from the neighbourhood of the sixth refuge. Of other species I took my first fresh *Euranessa antiopa* near the fourth refuge in August, a single specimen of *Erebia nostra* near the fifth refuge at the beginning of the same month, *Epinephele lycaon* at Bérisal abundantly in July and August, *Syrichthus carthami* and *S. caliae* at the second refuge in

July, *S. serratulae* higher up the pass, and *Erebia pronœ* var. *pitho* commonly in the middle of August, in the neighbourhood of the fifth refuge. There is, however, even in a late season, not much to be done after August 12th or 14th; my only noteworthy captures later than that date being a single specimen of *Colias palaeno* var. *europomene* at the top of the pass, and a single specimen of *Pieris callidice* on the Steinen-alp, only a few days later, and both somewhat the worse for wear. With the exception of the Steinen-alp all these localities can be easily and cheaply reached by the diligence which passes Bérisal about 10 a.m., the walk down being perfectly easy. The Steinen-alp is a good hour's steepish walk, but the air of Bérisal is such (when not too cold) as should enable any but confirmed invalids to walk any reasonable distance.

On August 30th we came down to Brigue, where we stayed most comfortably at the Hôtel Terminus, which stands actually on the station platform; on the same day I took a magnificent ♀ *Argynnis lathonia*, the autumn brood of which produces incomparably finer insects than the spring brood. The next day such heat suddenly supervened that only short hunts were possible, the mornings being always devoted to sketching in the shade. The best hunting-ground is, however, very near the station, and is to be reached by following a path to the left immediately after crossing the Rhone. Here I added to my list in the course of a week *Spilothyrus alcaee* (*malvarum*), *Thymelicus actaeon* (a good deal worn), one ♀ of *Satyrus statilius*, and an excellent specimen of *C. phlaeas* var. *eleus*. My other hunting-ground was just beyond Glis, where I found a birch-tree the sap of which was flowing in several places; this was a favourite haunt of *Polygonia c-album*, *Eugonia polycholorus*, *Pyrameis atalanta* and *Euvanessa antiopa*. In both places I also took specimens of *Thecla ilicis*, evidently a second brood.

Ten days spent at Lavey (September 12th to 21st) was at this time of year wholly unprofitable, but after returning to Veytaux I took a few specimens of *P. napi* var. *napeae*, in the fields behind the village.

The season of 1898 had thus added the following 39 new species or varieties to my collection: *P. mnemosyne*, *P. napi* var. *bryoniae* and var. *napeae*, *P. callidice*, *A. belia* var. *simplonia*, *C. palaeno* var. *europomene*, *C. chryseis* var. *eurybia*, *C. alciphron* and var. *gordius*, *C. phlaeas* var. *eleus*, *P. argus* var. *aegidion*, *P. zephyrus* var. *lycidas*, *P. optilete*, *P. pheretes* (♂), *P. orbitulus* ♀, *P. eros*, *P. escheri*, *P. icarus* var. *icarinus*, *L. arion* var. *obscura*, *L. euphemus*, *L. alcon*, *L. erebus*, *M. phoebe*, *M. parthenie*, *A. niobe* (type), *B. pales* var. *arsilache*, *E. mnestra*, *E. erias*, *E. ceto*, *E. lappona*, *E. pronœ* var. *pitho*, *E. aello*, *S. statilius* ♀, *S. alcaee*, *S. carthami*, *S. caecaliae*, *S. fritillum* var. *serratulae*, and *T. actaeon*. *P. hiera* is not included, as being too bad to set.

(To be continued.)

Note on *Melitæa berisalensis* (*berisalii*, Ruhl).

By C. FAYRE and M. WULLSCHLEGEL (Translated by G. WHEELER).

In the *Societas Entomologica*, no. 19, January 1st, 1891, our colleague, M. Ruhl, gives us a description of a new aberration of *M. athalia*, under the name of *berisalii*. This description, which, though a little incomplete, is otherwise satisfactory, is as follows:

"Alis anterociliis porrectis, alarum posticarum margine late diffuso, fere toto nigro, maculis lunatis in linea circumcurrente vix apertis; alis anticis subtus

multis maculis nigris magnisque; alis posticis subtus margine lunato, fortiter nigre cincto."

We consider that this description requires to be completed; which is only natural, considering that M. Rühl had at his disposal only some specimens taken by M. de Buren at Bérisal. Since then this butterfly has been found by us in the neighbourhood of Plan-Cerisier, near Martigny, and studied with the utmost care, from the egg to the perfect insect. The following are the results of our observations, confirmed, moreover, for the most part by such distinguished entomologists as MM. Daub, Püngeler, Wiskott, Séebold, Dr. Petry, &c.—

1. While leaving to M. Rühl his right of discovery, we correct the name of *berisalii*, which is not Latin, by giving it that of *berisalensis* (Rühl emend Favre).

2. This *Melitaea* is by no means a variety of *athalia*, but a true species, quite distinct from all its congeners; consequently M. Rühl has got on a wrong tack. *M. athalia* has only one brood, at any rate with us.

3. The life-history of the caterpillar of *M. berisalensis* is entirely different from that of other species of this genus met with in these parts. It lives exclusively on *Linaria vulgaris* and *L. minor*, on the latter for choice after it is half-grown. There are two broods, the first lasting from the end of September to the middle of May, and the second from the middle of July to the middle of August. In its earliest stage it lives in societies in a web made of a light silky substance; when half-grown the larvæ separate and hide under stones and rubbish, or in cracks in the ground. The larva pupates against rocks and walls, and remains in this state from ten to fifteen days before emerging.

4. The imago of the first brood begins to appear from the middle of May to the middle of June, and that of the second from the middle of August to the middle of September. It lays its eggs exclusively on *Linaria vulgaris*. The perfect insect measures from 40mm. to 43mm. across, at least in specimens of the first brood, those of the second are generally a little smaller.

The following are the constant characteristics of this species:

(1) The elongated form of the wings. (2) The two black lines forming the first band near the base of the upper wings are always straight and parallel without exception. (3) The borders of the lower wings, edged with black, always cover the lunules which are visible in the other species of this genus. (4) The underside of the lower wings is quite characteristic, having the light median band very narrow, the arrangement of the surrounding ground colour of vivid reddish-yellow being such that the general appearance of the underside of the lower wings approaches closely to that of *M. deione*. To these characteristics may be added also the following which are equally constant: On the underside of the upper wings, in the space corresponding with the lower portion of the median band, this species always (and invariably) has a black mark like a Y placed horizontally and opening outwards < thus, a mark which is never met with in the other species, not even in *M. deione*, which, as we have just said, resembles it the most closely; this mark is also visible on the upper part of the same wings. On the underside of the hindwings, between the basal and median rows of spots, is a triangular spot, whose lower acute angle rests on the last spot of the basal band, which gives a slight resemblance to *M. deione*, but to no other species. It is also distinguished by its flight which is more sustained and less jerky. Moreover, its form and characteristics are so constant, that one never meets with specimens which might serve as a connecting link with any other species of the genus. It is, therefore, really and truly a real and separate species, perfectly distinct from every other.

Its habitat is on very warm slopes where the food-plant grows and

thrives; at present we only know of two localities in addition to that mentioned by M. Rühl, viz., the neighbourhood of Plan-Cerisier across the vineyards almost to the tower of La Bathiaz, and round Saillon. Although Fully is very hot we have never met with it there. Is this because *Linaria vulgaris* is scarce there? We feel convinced that so far this rare species has not been met with elsewhere, and we ask nothing better than to be undeceived.

The Butterflies and Sphingids of the Penzance district.

By WILLIAM DAWS.

The Penzance district, being so little worked, should furnish some interesting material for entomologists. The following are notes that I have made on the butterflies and Sphingids observed principally in 1898:

HESPERIDES.—*Pamphila sylvanus*, fairly common in June, both on dusty roadsides and in swampy situations; two specimens also captured late in August, 1898.

PAPILIONIDES.—*Chrysophanus phlaeas*, decidedly scarce, in 1898, I saw no more than half-a-dozen examples. *Polyommatus icarus*, abundant, swarmed in 1898, when I captured most of the female forms *a* to *c*, mentioned in Tutt's *British Butterflies*, p. 175. *Cyaniris argyolus*, first seen flying on April 8th, 1898, when it was in fair numbers, but the second brood was very poorly represented. The larvæ here, I believe, feed on ivy, the flowers of *Escallonia*, and *Laurestinus*; holly is a scarce plant hereabouts. *Pieris brassicae*, first seen March 23rd, 1898, by the 28th they were flying in numbers, and there was a continual succession of broods until October. I captured the so-called spring form, *ab. chariclea*, with the autumnal form, *brassicae*, in October, so that the former is not confined to the spring brood. Great damage was committed in the autumn to the market gardens, fields of cabbages and broccoli being stripped throughout the district, whilst in September and October, 1898, the larvæ were crushed in hundreds in the public roads, and entered houses, &c., for the purposes of pupation; many pupæ were diseased and collapsed soon after pupation, exuding a fluid which smelt very offensively, whilst many larvæ were affected with ichneumons. The first *Pieris rapae*, a female, was noticed on March 20th, 1898, the species being only moderately abundant in this district; autumn pupæ were very scarce. *Pieris napi*, not observed until April 11th, 1898, the spring brood rare, and the summer brood far from abundant. I considered some of the ♀s heavily marked, probably *var. sabellicae*. The experiment related in *British Butterflies*, pp. 236-7, by which Mr. Hawes proved that from the same batch of June-laid eggs, part produced *var. sabellicae* in July, whilst the others went over and produced the ordinary form the following spring, is most interesting. *Euchloe cardamines*, appears early in the year, is fairly abundant in both sexes, whilst the *ab. turritis* is frequent. *Colias edusa*, decidedly rare in this locality; five specimens (two ♂ and three ♀) seen in 1898, the first on August 19th. *Dryas paphia*, about half a dozen poor specimens observed during the first week of August; in some years they are quite common. *Brenthis selene*, taken in the middle of May; it appeared to be very local, as I only found it in one spot, where, however, it was very abundant. *Vanessa io*, decidedly

scarcer in 1898 than usual; it generally appears here in large numbers. *Aglais urticae*, also scarce in 1898, not a dozen examples being seen, yet there was a fair number of hibernated specimens flying in spring. *Pyrameis carlui*, occurs in some seasons in hundreds in the Land's End district; in 1898 it was even more scarce than *A. urticae*. *Pararge eyeria*, first noticed on April 5th, and by the 8th it was fairly common; in 1898 there was a succession of broods, I believe it was a fourth brood that I found flying on October 10th, 1898. *Pararge megera*, both broods of this species have appeared in vast numbers in all the localities that I know here. *Hipparchia semele*, not so numerous in 1898 as in some seasons; I saw a few early in August, but they were very worn, and had probably been out some time. *Epinephele ianira*, in prodigious numbers in 1898, but I did not notice any particular variation except one ab. *pallens*, one or two male ab. *suffusa*, and one or two females with the fulvous well marked on the hindwings. *Epinephele tithonus* appeared to be partially double-brooded in 1898, as a few examples were taken during the first week in June, and the insect was still flying in good condition at the end of August. *Coenonympha pamphilus*, well out in May and very common, varying much, some small and dark, others large and more brightly coloured, some also had well-defined dark margins (I find similar aberrations in Nottinghamshire).

SPHINGIDES.—*Acherontia atropos*, a few taken here every season; a friend brought me one on September 17th, taken on a fishing-boat between Scarborough and Penzance. I also had one brought to me on September 30th, found resting above a house door—both are males. *Sphinx convolvuli*, fairly abundant; first seen this season on September 16th, when I saw three specimens. I took thirteen between September 16th and 26th, and saw many more. I found the best time for them was about 7 p.m.; one came to light at midnight on September 20th. Most of my captures were made at the flowers of *Nicotiana affinis*, and one of the workmen said that a neighbour's cat brought in a specimen on one evening and gave it to her kittens, it was not dead at the time but very much broken. Some seasons one or two larvæ have been brought to the museum. *S. ligustri*: the larvæ (more common than the imagines) are easily found at dusk feeding on the top shoots of the privet. I have seen a larva taken from a plant of the common blue passion flower, but the example did not pupate perfectly. Imagines were bred from June 12th to July 3rd, 1898. *Deilephila euphorbiae*, reputed to have been taken at Pendower Sands and at Tresco, but I have no data. *D. galii*, a worn specimen taken at Paul, in August, 1892, one taken previously at Wendron, August 26th, 1870. The first mentioned was taken by Mr. W. E. Baily, of Lynwood. *D. licornica*, several seen and one taken at Mount Edgecombe Park, June, 1870 (W. G. Stuart, *Ent. Mo. Mag.*, vol. vii., p. 110), one at Truro (A. P. Nix, *Entom.*, iv., p. 132), taken at Pennace Hill, by Mr. Sanders. *Smerinthus populi*, common; a male emerged on September 16th, 1898, from ova laid in June; it was only in the pupal state a month. *S. ocellatus*, fairly common in the locality, the larva feeding as much on willow as it does on the apple; imagines generally emerge from May 29th to end of June. *Chorocampa ceterio*: I had the pleasure of taking a fine female of this species on September 6th, 1898. I took it flying quite early in the evening, just before 7 p.m., about half a mile from

here, in the village of Paul; I saw another in the museum garden flying over a plant of fuchsia, but unfortunately for the museum collection I did not net it. Vines grow on the walls here, but I have not yet obtained larvæ. For speed this insect is hard to beat, I question if *S. convolvuli* can travel so fast. *Macroglossa stellatarum*, flying in greater numbers in 1899 than I have ever seen in previous years. If I had wished I could have taken hundreds at fuchsia flowers; the best time to capture them was from 8 a.m.-10.30 a.m., and again from 5 p.m. till dusk; fewer were observed flying in the middle of the day.

Migration and Dispersal of Insects: Lepidoptera.

By J. W. TUTT, F.E.S.

The migration of butterflies and moths is more especially interesting because the *raison d'être* that exists for migration in locusts, and, to a less extent, in dragonflies, is absent in these insects, for, in their winged state, they have no voracious appetite to satisfy that can possibly act as a stimulus to them to leave their native haunts.

It is probable that, in recent years at least, more attention has been paid to the lepidoptera than to any other order of insects. Those entomologists who make the lepidoptera their special study, far outnumber those who devote their attention to all the other orders of insects combined. Scarcely a county in Britain but has a bevy of careful and intelligent observers, so that the absence of an usually common species, or the influx in unusual numbers of a rare one, is at once recorded. It is not surprising, therefore, that there are many notes relating to the migration of these insects.

Probably one of the oldest references made to migrating butterflies is that of Mouffet who writes: "Wert thou as strong as Milo or Hercules and wert fenced or guarded about with a host of giants for force and valour, remember that such an army was put to the worst by an army of butterflies, flying in troops in the air, in the year 1104, and they hid the light of the sun like a cloud."

It is generally supposed that after the Glacial Epoch had given place to more temperate conditions, there was a gradual movement of living creatures from the south and east, northward. Butterflies and moths, the ancestors of those now in existence, doubtless shared in this movement, following slowly but surely the retreat of the ice, some at a nearer, some at a greater, distance, and, in a measure, even now, similar movements of certain species appear to be still going on. The occasional appearance of *Colias edusa*, *C. hyale* and *Pyramis cardui* (whose true home is in the warm Mediterranean region of southern Europe and northern Africa) in immense numbers, at more or less irregular periods and in comparatively high northern latitudes, points to northward movements of great magnitude, and to an attempt on the part of these butterflies to establish themselves in lands far removed from their native haunts.

A peculiar feature in the migration of lepidoptera is the large number of comparatively weak-winged species that have been observed at immense distances from land. That these flights are usually quite voluntary, and not due to wind-storms, is shown by the fact that many observers (among others Darwin) have noticed that the flights have commenced in calm and still weather.

One of the rarest of our British moths, and certainly one of the weakest on the wing, is *Detopeia pulchella*, yet this species has an immense geographical range, extending over the greater part of the Old World. Everywhere, however, its ordinary weakness of flight has been noticed. In spite of this, on March 27th, 1885, the sailing vessel *Pleione*, which was homeward bound from Wellington in New Zealand, and had not touched at any point after leaving Wellington, was surrounded in lat. $0^{\circ} 47' N.$, long. $32^{\circ} 50' W.$ (or about mid-Atlantic) by an immense swarm of this moth, many individuals of which alighted on the vessel. At this time, she was 440 miles from the nearest point of the American coast and 960 miles from the Cape Verde Islands, the nearest land in which the species is known to occur. Other well-known instances of moths having been captured or observed at sea, many miles from land, have been recorded. Tugwell reports (*Entom.*, vi., p. 80), on the authority of Captain Fuller of the steamship *Northumbria*, that, in September, 1871, when about twenty miles from Oporto, in fine weather, a very considerable number of moths made their appearance during the evening, and settled on the masts and sails of the ship, and these are described as "clustering in masses all over the ship." The species proved to be *Plusia gamma*. Lucas records (*Science*, ix., p. 340) that while in $25^{\circ} S.$ lat., and a thousand miles from the nearest portion of the coast of Brazil, his party "encountered several light squalls of wind and rain, during one of which two butterflies were driven past. The weather continued squally all night and for part of the next day, the wind coming from the westward. The following morning it was found that quite a number of lepidoptera had come on board and ensconced themselves in various places sheltered from the wind. They were mostly, if not wholly, nocturnal species of small size, although one large hawk-moth was among them. About twelve or fifteen specimens, representing nearly as many species were captured, and others seen, so that not less than twenty or thirty individuals must have reached the ship." Leech recorded (*Ent.*, xiv., p. 19) that in a voyage across the Channel in 1880 he searched the steamer for outward-bound moths and found two *Bryophila muralis*, one *Triphaena pronuba*, one *Cosmia trapezina*, besides several bees and wasps, and, on his return, three *Plusia gamma* and one *Mania maura*. Cockerell notes (*Ent. Mo. Mag.*, xxi., p. 159) that in June, 1879, he was crossing St. George's Channel in a steamship, when the weather was warm and misty, with little if any wind. About the middle of the day a number of insects began to alight on the vessel, whilst others were flying around, among those observed being *Pyrameis cardui*, *Plusia gamma*, *Nomophila noctuella*, &c., whilst among the Diptera was *Musca caesar*. He considered this movement to (or from) Ireland to have been quite voluntary. Mathew writes (*Ent.*, xxxi., p. 220) that, on August 15th-16th, 1898, H.M.S. *Hawke* was swarming with *Nomophila noctuella*, which had been seen every day since Gibraltar was left (August 11th), but only appeared on the 15th in such large numbers. The weather was perfectly calm and at noon of the 15th the nearest land, Cape Caccia, Sardinia, was 82 miles north-east of the ship whilst on the 16th, at 8 a.m., the ship was some 25 miles north of Corsica. Besides this species several *Pyrameis cardui*, *Macroglossa stellatarum*, *Plusia gamma* and *Scopula ferrugalis* were observed. Kerry notes (*Ent.*, xi., pp. 269-70) that on the morning of June 27th, 1878, thou-

sands of *Liparis salicis* appeared at Harwich, having crossed the sea. He reports that he was informed that they arrived at daybreak and resembled a fall of snow they were so numerous, and were also observed many miles out at sea. On the day of arrival they were seen in hundreds at rest on the buildings facing the sea. In the *Proceedings Ent. Soc. London*, 1889, pp. xxxi-xxxiii, is an account of a numerous flight of various kinds of moths observed by Hall about halfway between the river Plate and Rio, and at a distance of over 250 miles from land (lat. 30° S., long. 46° W). The visitation commenced in the evening, lasted more or less all the next day and part of the succeeding night, and, as the ship steamed about 300 miles a day, it follows that the atmosphere for about 400 miles must have been pretty full of the moths, several of which were caught (the names, however, not mentioned). It was supposed that the insects might have been driven off the land by violent westerly winds, but on arrival at Rio, no violent winds appeared to have occurred. When the insects were taken the wind was moderate from N.N.W. The occurrence seemed to be of more than ordinary interest, owing to the many families, genera and species which must have been represented in the swarm, for, besides the specimens preserved, there appear to have been numerous other kinds, large and small. At the same meeting Mr. J. J. Walker stated that he had seen a large number of insects at sea, about 150 miles off the coast of Brazil. Other records may be found in Coppinger's *Cruise of the Alert*, and we shall have occasion later to refer to Darwin's account of a similar phenomenon in the *Voyage of the Beagle*. Walker further notes (*Ent. Mo. Mag.*, xix., p. 1) the capture of a very large moth, somewhat like *S. convolvuli*, but seven inches in expanse, that flew on board H.M.S. Kingfisher when off Calloa, in November, 1881, whilst he also took in the same manner *Naropsis fastuosa*, a species figured in the *Ent. Mo. Mag.*, vol. iv., p. 193, from a specimen taken in Limehouse, in what may be termed the centre of the London docks.

Of the stronger-winged species Cordeaux notes (*Nat.*, August, 1884) that some years since many *Sphinx convolvuli* were washed up by the waves on the coast between Spurn and Kilnsea, having doubtless perished in crossing, and quite recently three *Acherontia atropos* were received, the moths taken on vessels far from land in the North Sea. A fine specimen of *S. convolvuli* is reported by Bold to have been taken on board the Lord Raglan, September 29th, 1868, at sea, five miles from Tyne-mouth, and another, captured on a sailing vessel at some distance from the land whilst making for the Tyne. Webb notes another specimen of the same species that flew on board a smack in the North Sea, 60 miles from land, towards the end of August, 1895. Fothergill observes that, in 1877, a specimen of *Acherontia atropos* flew on board the steamer Cameroons, when on a voyage home from Africa and 200 miles off the Cape Verde Islands. Another example was captured between Algiers and Gibraltar, another 25 miles off the Irish coast, whilst Kerry notes (*Ent.*, xii., p. 271) another caught on board the Cork lightship, moored seven miles from the coast, at Harwich, in September 1879. Frohawk exhibited (*Proc. Sth. Lond. Ent. Soc.*, 1895, p. 52) an example of this insect washed ashore in Glamorganshire in the autumn of 1895, and another taken at the lighthouse of St. Agnes, Scilly. Billups exhibited at the meeting of the Ent. Soc. of London, September 24th, 1891, a specimen of *Deilephila capensis* captured at sea some 472 miles

from Gibraltar, by the captain of a vessel, on which three specimens came aboard. *Aplecta occulta* was noted (*Ent. Mo. Mag.*, viii., p. 16) as being captured in the Atlantic, 220 miles from Nova Scotia, in 1871. McLachlan at the meeting of the Ent. Soc. London, April 4th, 1877, exhibited a specimen of *Ophideres materna*, a Noctuid moth (common in India, found also in Africa, specimens having been recorded, too, from Brazil and Florida), taken at sea in lat. 25° 24' S., long. 62° 10' E., the nearest land being the Island of Mauritius, about 360 miles distant. A large Noctuid moth, *Erebus odora*, captured in the South Atlantic in about 28° S. lat. and 26° W. long., was also exhibited at a meeting of the Ent. Soc. of London some years ago.

The capture of butterflies at great distances from land is, perhaps, of even more common occurrence. Besides those already mentioned, *Euranessa antiopa* is recorded as occurring off the coast of North Carolina, 25 miles from land, and *Anosia archippus* in the South Pacific, 500 miles from land, whilst Harker observed the latter species off the coast of Portugal, 60 miles from Cape St. Vincent. Barrett notes (*Ent. Mo. Mag.*, xxix., p. 163) specimens of this insect, of the North American type, captured about 1880, on board a vessel in the Atlantic, at a distance of from 200-300 miles from the western shores of Britain. We have in our possession specimens of both sexes of *Hypolimnas misippus* taken in the Atlantic Ocean by Captain Ellis, more than 500 miles from land; these specimens were part of a great flight. Crompton records (*Ent.*, xxix., p. 12) the first appearance of this species in Tenerife, in 1895. Grapes notes (*Ent.*, xxi., p. 161) *Pieris brassicae*, *P. rapae* and *Pyrameis atalanta* eighteen miles from the Isle of Wight; a small butterfly, like a fritillary, 35 miles from St. Antonio, one of the Cape Verde Islands, and a *Pyrameis* like *P. cardui*, but with an ocellated spot of considerable size on each forewing, off the coast of New Zealand, on December 6th, 1886. On September 16th, 1865, the ship Whinfell was overtaken by a cyclone at a distance of about 600 miles from Cambia, on the coast of Africa, and 200 miles from the Cape Verde Islands, the nearest land, when a great many birds and butterflies came on board, the latter very numerous. The species proved to be *Hypolimnas (Diadema) misippus* and *Pyrameis cardui*. The former is essentially an Old World species, abundant in tropical Asia and Africa, but has, comparatively recently, spread to America. It has a very wide range, as might be expected from its habits, extending from northern Australia and New Guinea on the one hand, to Florida, in the United States of America, on the other. Radley records *Isamia asela* as being observed flying out to sea 100 miles from the Maldiv Islands, and Holdsworth states that he believes there is a regular migration of *Papilio hector* from India to the north-west of Ceylon, at the end of February, as he repeatedly saw, from ten to sixteen miles from land, straggling parties of *Papilio hector* flying low and steadily towards the coast of Ceylon, with a course nearly due east, and at a part of the Straits, which is 60 miles across. Many other cases of moths and butterflies being observed at sea are mentioned incidentally in this chapter.

None of our British moths are more capricious in their appearance than some of the large hawk moths. For many years in succession some species are never met with in any stage, then, from various parts of the country, large numbers will be simultaneously recorded and many indi-

viduals captured, when again, for many years the species will totally disappear. That many of the species that occur thus capriciously migrate, is well known. We have already (*ante*, p. 321) noted the capture of several *Acherontia atropos* far from land, but a much more powerful insect on the wing than the last is *Sphinx convolvuli*, and the uncertainty of its appearance in Britain has long puzzled those interested in such matters. In some years, this species abounds in the gardens of southern England, its long proboscis (several inches in length) thrust deep into the nectary of the tobacco plant (*Nicotiana affinis*), petunia, &c. Yet the uncertainty in its appearance does not seem difficult to explain. In its more southern home (in northern Africa) the moth emerges from the chrysalis in May. It at once lays its eggs, which soon hatch, the larvæ pupating in July, and giving rise to a second brood of moths in the following month. These lay eggs, and in the sunnier climes of the Mediterranean shores, the caterpillars feed up, and change to pupæ in the autumn, the moths not emerging until the following spring. If a few migrants of the spring brood reach our shores, they lay their eggs in the ordinary course. The larvæ which hatch from these find our summer quite hot enough and, accordingly, they feed up, pupate, and, in the autumn, produce a second brood of imagines, just as would have been the case if the eggs had been laid in the more southern home of the insect, the only difference being that they take a week or two longer over their development here than they would have taken there. The progeny of this brood is, however, usually unable to reach the chrysalis stage before our winter is upon them, the caterpillars are killed by the cold, and thus the species is prevented from taking up a permanent abode among us. This was proved clearly by Poulton, who, rearing this latter brood in confinement, and under especially favourable artificial conditions, did not succeed in getting pupæ until winter had arrived.

Closely resembling this species in the uncertainty of its appearance and in its inability to make a permanent home in Britain, is the powerfully winged *Deilephila galii*. This insect is, however, not double-brooded. The moths emerge in June, the migratory instinct leads them, in certain years, at once to spread abroad and they occasionally reach our shores. In the summers of 1855 and 1859 the moth abounded in a few localities in England, but from the latter year, until 1870, hardly a single specimen was noticed. In the latter year the moths suddenly appeared in surprising numbers in June, and, in the autumn, all our long stretches of sandhills, where the bedstraw (*Galium*) grows luxuriantly, were covered with the larvæ. Hundreds were captured, and hundreds—nay, thousands—must have escaped, for thousands of acres of suitable ground were never searched. From those captured, and afterwards reared artificially through the autumn and winter, many moths were bred during the early part of the next year, but whilst they thus survived under artificial conditions, there was no reliable record of the occurrence of even a single specimen at large for that year, thus proving conclusively the inability of the pupæ of this moth to stand our winter climate. From 1870 until 1888 there was scarcely a whisper of the capture of a British specimen of this species, but, in July of the latter year, the imagines again suddenly appeared in considerable numbers, and the caterpillars were found in the greatest profusion a few weeks later, as they had been on previous

visitations. Hundreds were bred by those who treated the pupæ artificially, yet, in 1889, the insect was entirely absent in those localities in which it had been so abundant the previous summer and autumn. Since then there has been no "*D. galii*" year in Britain, although a few examples were recorded in 1897.

In cases such as that just described, we have an instance of a moth that can only be considered as an "occasional" British species. There are, however, other moths, which have a more or less permanent habitat in our Islands, but whose numbers are now and again reinforced by immigrants, much to the advantage, undoubtedly, of the native race.

One of these is the usually common *Plusia gamma*. Probably a season rarely passes without some immigration of this species taking place and, in some seasons, vast numbers undoubtedly arrive. It must not be overlooked that most moths fly by night, when it is quite impossible to see their movements; our conclusions, therefore, are based rather on indirect than on direct evidence of the fact. But these conclusions are undoubtedly correct in very many instances. One fine May morning in 1892, we were in Chattenden woods near Rochester. The ordinary butterflies and moths appearing at that time of year in that locality were observed. We spent several hours in the wood and never saw a specimen of *P. gamma*. The next day, we walked over the same ground, and every footstep stirred up numbers of imagines of this species. Thousands were there, and we noticed then that many of the specimens were exceedingly pale, a striking characteristic of the south European examples which we have frequently observed. In the course of the next few days, we were inundated with letters from various parts of the country, recording the sudden appearance of this moth on that particular day. They swarmed even in our London gardens. Whence came they? *P. gamma* had been comparatively rare in Britain the previous autumn. The pale tint and ragged wings of some of the specimens suggested that they were of the south European form, and not recently emerged, and there can be no reasonable doubt that on the night preceding our second visit to Chattenden Woods there had been an extensive immigration of this species.

This moth has been chosen as an example to illustrate the particular phenomenon exhibited by a sedentary moth increased in numbers by immigration, because sudden appearances of this kind are not at all infrequent in the case of this species, and every observer will almost certainly, in the course of a very few years, be able to test the facts and draw conclusions for himself.

(To be continued.)

Dehiscence of the female pupa of *Fumea casta* (intermediella).

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

The ♀ of *Fumea casta* (*intermediella*) after emergence sits at the end of her case, with the extremity of the abdomen applied to the opening of the pupa-case, into which she is afterwards to place her eggs; she is in many respects so helpless that one jumps to the conclusion that she does so to enable her to keep in touch with it, and not to lose knowledge of where it is. She raises the extremity of the

abdomen from this position only for a brief period, some five minutes altogether perhaps, during the visit of the male. There are two reasons, however, that show that the keeping-in-touch idea is probably erroneous, certainly not the whole matter. The dehiscence extremity of the pupa-case is a very definite and recognisable structure, with a free aperture that the tactile arrangements of the ovipositor ought easily to recognise, and, more convincing, if the female be removed from her position she gets back to it without, apparently, much difficulty. My own belief is that she sits so closely to prevent the entrance of any parasites or enemies, the terminal wool forming a good *cherneau-de-frise* against anything from mites upwards. *Fumea* does not mix much wool with her eggs, but accumulates a good deal about the pupal opening during oviposition, and does a lot of work after, chiefly, apparently, with the object of introducing as much as possible of this on the top of the eggs and about the opening, as a fence against marauders. These facilities for oviposition, and the necessity of these special protective devices on the part of the moth, are to be found in the method of dehiscence of the female pupa. The pupa-case is not brought out of the sack, as in *Solenobias*, nor is it left entirely within it, as in the *Psyches*, but comes forwards so far as to bring the mesothorax level with the mouth of the sack. At this point the 3rd thoracic and wing-cases remain together, and form an impediment to the further advance of the pupa, whilst the parts in front are so disposed as to form a ring just outside the opening of the sack, and so, as it were, rivet the pupa-case in that position.

The mesothorax splits dorsally, and separates from the metathorax, but remains firmly attached to the wing-cases and assumes a sloping position, its dorsal end being just outside the sack, its other extremity firmly fixed to the wings. These pieces, therefore, one on each side (or rather more dorsally), are all of the exposed pupal parts that occupy the narrow neck of the sack, and, by their elasticity, taking a firm basis by their attachment to the wings, maintain the opening. Outside the sack the prothoracic piece is attached to the anterior margin of the dorsal end of the mesothoracic piece in such a way that it lies along the edge of the opening of the sack, its inner surface sloping outwards so as to make the opening funnel-shaped where it is, and form the dorsal portion of the outer member of what I have compared with a rivet. It carries at its anterior margin the dorsal head-piece, which has no other function than to slightly extend the slopes of the funnel.

Round the rest of the opening of the sack, *i.e.*, opposite the venter of the pupa, extend from the ventral ends of the prothoracic pieces, two filmy but very tough shreds, united to the portion that includes the head-piece. This portion consists of the head, antenna- and mouth-parts, and the anterior legs. These filmy shreds are, in fact, the pupal investment of that part of the prothorax that is covered by the appendages in the pupa, as well as the basal portion of the leg-cases. It takes its attachment ventrally (one is apt to fall into familiar, but inaccurate, language and say in front, though front is opposed to back, and is so far correct, but is also synonymous with anterior, which would be wrong) to the points of the femoral pieces, the pieces that in these pupæ look so like maxillæ or labial palpi. The front piece thus tethered leans outwards, and forms the slope of the funnel-shaped aperture in front (as opposed to back). To the same point the second

leg pieces remain fixed by one end, the other ends slope outwards and form sides to the funnel. From this point also extends directly backwards (as opposed to forwards) another cable of filmy chitin, which is attached by its other extremity to the end of the wings where they form part of the solid pupal mass. This is no doubt the pupal covering of both the mesothoracic femora, and it fastens these face-pieces down solidly in position against the opening of the sack.

We have, then, within the sack, the undivided mass of the pupa-case as far forwards as the 3rd thoracic and the anterior wing-cases of 2nd thoracic, outside the sack, but closely appressed to its mouth, a ring formed of the 1st thoracic parts, both the dorsal portion that is exposed and the ventral portion that is covered, in the pupa. This ring carries other parts, so as to make a funnel-shaped opening, *viz.*, the head- and face-parts, the leg-cases of its own segment and of the 2nd thoracic. Its own plates, supplemented by the dorsal head-pieces, slope outwards dorso-laterally, the first legs with face-parts slope out ventrally, and between these the second leg coverings. These two portions of the pupa are held firmly together in front by a ligament, formed chiefly of the 2nd femora, dorsally by the stiff mesothorax, continuous with its wings below, and articulated to the dorsal end of the prothorax above, and forming at the same time a spring to keep the mouth of the sack (and pupa case) open.

Entomological Science in Schools.

By ALLEN S. HEPDEN.

Knowledge of the great interest which the Editor of *The Entomologist's Record* has in the scientific training of children in our Elementary Schools and the suspicion that many entomologists are themselves managers of these schools, impel me to place before the readers of this magazine some of the "facts" which are taught in these schools under the name of Elementary Science. The Education Department awards large sums of money as grant aids to managers of such schools for many subjects, of which this is probably the most favoured. As teachers cannot possibly become specialists in every branch of science, and as this subject has to be taught as an introduction in general science (specialisation taking place later), it follows that these guides of the young intellect must have recourse to text books, and, indeed, the School Board for London decrees that where Elementary Science is taught, a reader dealing with it shall be in use in the classes taking it, so that the teacher is compelled to use the latter, in addition to his own manual. In theory teachers may be said to be allowed to choose their own books, in practice they have to select from a list already chosen for them. From these reading-books, I have culled a few glaring errors and instances of gross ignorance on the part of the authors, which errors are being instilled daily into the minds of the rising generation as truths. I will only give here a few of the extracts which appeal more particularly to entomologists as such. Here are some :

LEPIDOPTERA.

A.J.—"Look at that beautiful butterfly! Throughout the cold dark winter it was not the gay creature it now is. It was a dull-looking grub or

chrysalis, seemingly without life. But the growing warmth of the spring sun began to work a wonderful change within that grub. One bright morning, the dingy case broke open and out flew the winged beauty which you now see flashing in the sunshine." [The accompanying woodcut shows a "Peacock" butterfly (*Panassa io*).]

M. iii., 127.—"I did little else but feed from morning till night, and as I fed and grew, my skin split in all directions, and I threw it off from time to time, always finding a new one underneath. Well, after a while, I suppose I must have reached my full size, for I had no longer any desire to eat. I seemed to want to sleep. I rolled myself up in a snug ball, gummed myself into the leaf, and covered myself with a loosely-spun, flossy silk. I think people called me a pupa or chrysalis in those days, but how long it lasted I shall never know. All I do know is that when I woke up, I was no longer a crawling larva, nor was I a pupa, but I found myself furnished with the most beautiful wings."

C. 62-64.—"The worms continued to spin till the shells were too thick for us to see through; but we could hear their little 'click,' 'click,' 'click,' as they worked away inside. . . . If they are allowed to live, they will break the delicate threads. Their home has no door. They must bite a hole through the walls when they wish to come out."

C. 104-106.—"He (a caterpillar) drew out of his mouth a sticky fluid and with it painted his whole body. . . . It would bind him to the fence when he lost the power to hold himself and make a coat to keep out the wet while he was taking his winter's nap. . . . One summer morning when I was dressing in my room I heard a little pecking sound. I thought at first it was a hungry mouse but as I chanced to come near the mantelpiece to my great surprise the caterpillar cocoon was shaking and from one end something was pushing itself out. It proved to be a tooth nibbling at the end to make an opening. Then a head appeared and after a few more violent struggles a lovely butterfly came in sight."

C. iii., 173.—"Butterflies lay their eggs on the leaves of plants. The warm sunshine causes them to burst open, and out comes from each a little green caterpillar. It has a large head, eight feet and no wings. The caterpillar feeds on cabbage leaves. At last it does not care to eat, and seems too weary to move. So it seeks a quiet place and fastens itself to a twig—dangling by a thread which it makes itself, as a spider dangles from its web (a figure is given with a pupa of *Pieris brassicae* dangling from a thread which is attached to the nose-horn and the cremaster hangs free.—Ed.). Soon a thick brown skin, almost like a thin shell, grows over it and the caterpillar is shut in entirely. In this form it is called a chrysalis or pupa. There it hangs until the spring comes. Then the chrysalis splits open and out comes a butterfly. This new creature has four wings, closely folded round its body, and six legs. In the warm sunshine it stretches out its legs; gradually its wings unfold and away it flies."

N. iii., 110.—"The cocoon breaks open and a perfect insect (butterfly or moth) creeps out ready to fly about and lay some tiny white eggs."

C. iii., 25.—"The silkworm is a kind of caterpillar. It has sixteen legs, and seven very small eyes on each side of its head. The caterpillar becomes a moth when it has spun its silk. The ball is of a pale yellow colour and about the size of a pigeon's egg. In this ball the worm changes, first into a chrysalis, and about fifteen days afterwards into a moth. Then the moth works its way out with its head and hooked

feet and flies away. But when the silk of which the cocoon is made is wanted for manufacture, care is taken not to let the moths eat their way through. The silkworm has sixteen legs, fourteen eyes, and twelve rings round its body."

A. ii., 122.—"Now the silk worm is ready to change into a moth. To do this it must make a kind of case or shell, in which it may become a chrysalis and rest for a time. This is called a cocoon. The silk threads come out of two little tubes in the caterpillar's mouth. Then it stops, and if left alone it would, after a time, eat its way out of the cocoon and appear as a perfect insect—a bright and beautiful moth."

HYMENOPTERA.

C. ii.—"The drones are lazy bees. The workers do all the work. Some fly away early in the morning to gather honey and pollen from the flowers and wax from the leaves of some plants." (The bees figured have hymenopterous bodies with dipterous wings.—Ed.)

A. ii., 96 *et seq.*—"Some insects, like the bee, make honey." . . . "The bee is an insect which gathers honey from flowers." . . . "They (the workers) live about two months." . . . "The drones are males and live a life of pleasure." . . .

A. ii., 106.—"She (the queen) lays all the eggs out of which young bees come."

M.—"The bees thighs form baskets." "They (bees) have no jaws."

B. iii., 38.—"The rest of the members of this kingdom are drones, lazy fellows, all of them, who loll about, eating, sleeping, doing no housework, gathering no honey, but simply taking care that they get enough to eat themselves."

C. iii., 147.—"Older ants take care of the baby ants, and when they come out of their shells, help them to unfold their legs and wings. Ants live together in large numbers in nests underground. The nests are guarded by soldier-ants that sleep nearer the surface of the ground than the others. They call the others up in the morning." . . . They also make little cows of certain insects which suck the sap from plants. When they want a drink from them they stroke and pat the insects, which then throw out the thick, sweet, sticky juice which the sap has formed in them. If the insects do not give it to them, they draw it from them with their feelers or antenna."

GENERAL ENTOMOLOGY.

A.J.—"The heat and light of the sun works in the world in giving new life to insects."

A.—"Some winged insects are called eaters because they eat their food with their mouths."

A.—"A cricket is a beetle."

A.—"The mouth (of an insect) contains tiny sharp teeth."

Av. iii., 103.—"In all these wings there is a network of lines which stiffens them out and supports the thin substance of the wing, just as the frame of a kite stiffens and supports the paper stretched upon it. . . . These lines are known as veins."

DIPTERA.

N. i., 99.—“The mouth of a fly is a little trunk or tube *like the trunk of a tiny elephant*.” . . . “These worms (fly larvæ) eat a great deal and then go to sleep.” . . . “Flies feed on dirt of all kinds.”

One book has a full-page illustration with the legend “Bees at flowers.” The puzzle is to find the “bees” for the insects figured are all Diptera.

Now, Sir, I would appeal to you to use your great influence to help us, who work in these schools, to dispel these dense clouds of ignorance from the training-grounds of future England; and I would also appeal to all those who are anxious to see the youth of our country grow up intelligent and well-informed men and women, especially those who are in positions to influence the work done in our schools, to take an active part in seeing that the money spent on science instruction is worthily spent, and that natural science shall take the honoured place that Huxley long ago gave it as one of the most powerful educational instruments for the training of the human intellect.

Entomology as a subject of instruction in schools.

With the advance of scientific education, the natural history subjects have become a general feature, in some form or other, in the curricula of many schools. They are taught in our elementary schools as Mr. Hepden has pointed out in the preceding article under various titles, and, as “Object Lessons” and “Elementary Science,” claim a fair share of attention. In fact, as Object Lessons, natural history is taught in almost all our schools, and large sums of money in the form of grants are paid for the instruction thus given.

We are continually receiving cuttings from papers from entomologists, usually headed “Newspaper Entomology,” and setting forth in no measured terms the contempt of the sender for the writer, but this must continue so long as the publishers of school books are careless as to the contents of what are launched on the educational world as “Object Lesson Readers,” “Elementary Science Readers,” and so on. Errors absorbed by a youngster are exceedingly tenacious and are rarely thoroughly eradicated. The Education department, we believe, takes no practical means to check the circulation of these books that are one mass of errors, even in the most elementary principles and facts of science, and H.M. Inspectors appear to be ignorant of, or too busy to attend to, the matter, which must be daily under their observation. The managers of schools (who are personally responsible for the selection of the books used) seem to take no interest in the accuracy of the books selected, and the teacher himself usually selects the easiest, and not the most accurate, readers for use in his school.

Mr. Hepden's article shows that this carelessness (or ignorance) of the authorities has become little less than a public scandal, and he asks whether entomologists cannot help him, and others like him, to bring pressure to bear on the authorities who are responsible. Bad as are the errors in matters entomological found in these books, mostly paid for out of public monies, they are as nothing to those in some other branches of science. Our readers would say that it was impossible

that the frontispiece of a "science reader" published quite recently should contain in tabular form the following legend :

Animals.—Backboned : Horse, man, &c.

Boneless : Eels, snakes, &c.

One would like to know the rest of those "boneless" animals, and make the acquaintance of the authority on this subject.

The quotations in Mr. Hepden's paper are not taken from the books of small and obscure publishers, but from those whose really scientific books take the first place in the world. Is it simply that these publishers consider that anyone can write a book for a child, when, as a matter of fact, the combination of knowledge and literary skill should be at its greatest for this purpose? One would scarcely believe that the publishers of our standard entomological literature would allow such a statement as—"The beetle has a strong pair of biting jaws or mandibles and another pair of chewing jaws and so have all insects that live on solid animal and vegetable food. They bite off their food with their mandibles, and chew it with their chewing teeth." Another publisher, himself a *litterateur* of the first rank, allows in one of these the following—"The mouth of a fly is a little trunk or tube like the trunk of a tiny elephant. . . . These worms (dipterous larvæ.—Ed.) eat a great deal and then go to sleep. . . . Flies feed on dirt of all kinds," whilst other publishers equally well known in the literary world allow that, as silkworms spin their cocoons, you can hear their little "click, click, click, as they work away inside." We are not often offered such a parody on entomological science as the quotations that form the bulk of Mr. Hepden's communication combine to make. Although quite different from the run of articles generally accepted and printed in this magazine, it is totally impossible to refuse to publish such a challenge to those in authority, and one may sincerely hope that the powers that be will see that public monies spent on education are not wasted in perpetuation of gross errors, which are, at the same time, a disgrace to the present progressive trend of education, a serious reflection on those who are responsible, and a scandal that needs the pen of a Dickens to expose thoroughly.—Ed.

Habits of the imago of *Smerinthus ocellatus*, Linn.

By L. J. LAMBILLION, Vice-President of the Ent. Soc. of Namur.

On May 25th, 1898, Mr. Franz Derenne was kind enough to give me a fine pair of *Smerinthus ocellatus*, I was particularly thankful because, for some time, I had been desirous of making some observations on the copulation and egg-laying of this interesting species. As the insects were paired and perfectly quiet I placed them on the window-curtain of my room, where they remained immovable until about 7.45 p.m. At this time, assuming that they would soon prepare for flight, I watched them carefully so as to observe them as soon as they should awake from their sleep. The male first became restless, vibrated his wings rapidly for some seconds and appeared to warn the female that it was time to separate (one knows that the genital organs of the Lepidoptera are so formed that it is the female that retains the male during copulation). The female, however, did not stir and two or three minutes later the male again vibrated his wings (more rapidly

than at first) and this lasted for about half a minute. This aroused the female who set free her companion, the latter immediately taking flight. It would be interesting to know whether the male sought another female, but, on his departure, the female slept again and did not reawaken until 8.15. I then immediately enclosed her in a great muslin bag in which was a large leafy willow branch on which to deposit her eggs. She flew noisily, stopping frequently to deposit an egg on a leaf. In about 35 minutes she rested against a branch and became still. The following evening she repeated the business and did so for six consecutive days. I carefully counted the eggs laid each day with the following result: 1st day (May 25th), 96 eggs; 2nd day (May 26th), 65 eggs; May 27th, 138 eggs; May 28th, 54 eggs; May 29th, 33 eggs; May 30th, 18 eggs; the female dying the following day. I immediately convinced myself that there were no more eggs in the body, the moth having completed the egg-laying on the 6th day, and I had 404 eggs. I need not describe the egg as it has already been described by more competent observers (*c.g.*, *Ent. Record*, vi., p. 173).

On June 8th, I obtained 384 larvæ and 20 eggs remained unhatched. I shared the caterpillars with several of my colleagues, retaining 200 for myself; these I reared on *Populus canadensis*. I need not describe the well-known larva, which varies little. I had reason to be satisfied when I lost only 7 or 8 larvæ during the first instar. On July 8th—30 days after hatching—the earliest larvæ entered the ground, and, 8 days later pupation was completed and I only had to await the spring for the emergence of the imagines. The pupæ, in a wooden box, passed the winter in an unheated room. The pupæ were placed on a bed of "heather" mould and covered with moss. The first imago emerged on May 27th, 1899, and the emergences were continuous for 15 days—177 perfect imagines and a score of cripples.

There remained a final experiment to make. I wished to know if copulation would take place in captivity, and if so, whether I should obtain as many eggs as were laid by the ♀ parent of the brood.

The imagines generally emerged at from 6 a.m.-8 a.m. Immediately their wings were dry they settled down until about 8 p.m., when the males began to fly, seeking the females, and pairing with them freely in the enclosure. As is generally the case, the insects remained at rest, apparently sleeping during the period of copulation—some 22-23 hours. The couple arranged themselves vertically, the male with its head pointing downwards as other observers have noticed in other species. I purposely disturbed several pairs but the female almost immediately returned to the previous position, and I concluded that this was possibly necessary owing to the weight of the abdomen of the female. Separation took place in the same manner as I have described for the first pair at the commencement of this note. Wishing to know the number of eggs laid, six pairs were kept under observation, and the eggs laid by the females numbered respectively—284, 220, 187, 160, 121, and 93—*i.e.*, a total of 1065 eggs, with an average of 178 for each female. May I conclude from this that the insect is more fruitful when at liberty than in captivity? or, is there some other reason, which, until now, has escaped the notice of observers? Here is still a point for investigation.

I have taken the greatest care with the observations here recorded, without pretending that I have at all exhausted the points touched on in the life-history of this interesting species.

HYMENOPTERA.

PLATYLABUS PEDATORIUS, FAB.—In answer to my request for Ichneumonidæ, Mr. Tutt kindly sent me three bred out in his pupa-cages on April 15th last, and another of the same kind upon the 19th. Of these the first were ♂ and ♀ ♀, and the second ♀, which I have only just determined to my own satisfaction. I have now no doubt that they may be referred to *Platylabus pedatorius*, Fab. (*E.S.*, ii., 133). Fabricius, however, only knew the ♂. Richter bred both sexes from pupa-cases of *Geometra chenopodiata* (= *Pelurga comitata*). These latter belonged to var. *P. iridipennis*, and are described by Gravenhorst as a distinct species under that name (*I.E.*, i., 194). All Mr. Tutt's specimens belong to the type form—without the distinctive white line before the radices of the wings. The genus appears to be of unusual occurrence in Britain, with the exception alone of the present species. I have once received *Platylabus pactor*, Wesm., from the London district. Unfortunately Mr. Tutt cannot tell us what was the host of *P. pedatorius*, nor, indeed, if it came from British pupæ. It seems especially to affect *Eupithecia*, having been bred from *E. sobrinata*, *nanata*, *exiguata*, *pimpinellata*, and *innotata*. In Britain, Golding-Bird has bred it from *E. subnotata*, and it also preys upon the continental *E. scopariata*. Its only other known host is *Hybernia defoliaria*, for which, perhaps, it was seeking when taken, as Gravenhorst tells us, at oak; he also saw it on umbels, and I once found a large ♀ upon *Heracleum sphondylium* in Bentley Woods, near Ipswich, in 1894. May I add that I shall be glad of any Ichneumonidæ bred or captured?—CLAUDE MORLEY, F.E.S., Ipswich. October 20th, 1899. [Since writing the above, I have found another specimen of *P. pedatorius* in my collection; it is a ♂ and was bred by the Rev. C. D. Ash, B.A. (who kindly sent it to me alive on June 26th last), from a larva of *Dianthoeccia carpophaga*, from Shoreham, Sussex, upon June 23rd. This specimen is much larger than Mr. Tutt's ♂, and has the post-scutellum yellow at its apex, the inner orbits of the eyes only (instead of the whole face) are so marked, and the posterior tibiæ, as well as the extreme apex of the femora, are entirely black. It may be well to here point out that a good sexual character (which I find nowhere mentioned) is to be found in the conformation of the postero-medial area of the metathorax, which is nearly quadrangular with the lower angles produced in the ♀, but much narrowed transversely in the ♂. This character will, I fancy, be found to be persistent.—C. M. November 7th.]

ORTHOPTERA.

Notes on the Decticidæ with descriptions of new species.

(Concluded from p. 298.)

By MALCOLM BURR, F.Z.S., F.E.S.

DRYADUSA FLETCHERI, sp. n.—*Satura maxima*. Colore fusco, badio. Caput magnum. Pronotum antice rectum, postice productum, margine postico rotundato, carinis lateralibus nullis, carinula media longitudinali distincta, carinis lateralibus obsoletis, metazona tantum discretis, lobis deflexis nitidis, margine postico obliquo, sinu humerali nullo, colore fusco-testaceo, nigro-notato. Elytra valde abbreviata, marginem posticum segmenti primi abdominis vix superantia. Alæ nullæ. Pedes validi. Femora postica subtus spinosa; tibiæ anticæ supra 4-spinosæ; tibiæ

posticæ spinis terminalibus 4 armatæ. Plantulæ liberæ brevissimæ, inferæ, primo segmento tarsorum multo breviores. Lamina subgenitalis subtus truncata, haud sulcata. Abdomen fuscum. Lobi mesosterni in spinas, metasterni triangulariter producti. Ovipositor elongatus, rectus, apicem versus decurvus, apice ipso oblique truncatus. ♀. (♂ ignotus.) Long: corporis, 54mm.; pronoti, 14.5mm.; elytrorum, 12mm.; femorum posticorum, 36mm.; ovipositoris, 35mm.

Patria.—China, at Leu-kung-tao, in Wei-hai-wei, November 6th, 1898.

This magnificent species was taken by Lieutenant T. B. Fletcher, of her Majesty's ship "Centurion," to whom I am indebted for many interesting Orthoptera from Wei-hai-wei, Korea, and Japan, and it is with a real pleasure that I dedicate this species to him. It cannot be mistaken for any known form, and will later have to be removed to a new genus. It differs from *Drymadusa*, Stein., in many points. The head is larger and more produced, the pronotum is considerably longer; the presence of the central keel on the pronotum, the absence of the humeral angle of the lateral lobes, the anterior tibiæ with four, and not three, spines in front on the upper margin, and the form of the subgenital lamina in the ♀, all tend to distinguish it. Also the lobes of the mesosternum are not merely triangular as in *Drymadusa*, but are produced into long spines. The metasternal lobes are triangular. It is, however, not satisfactory to establish a new genus upon a solitary female. The very short plantulæ, and the spiny femora show that it is to the *Drymadusa* group that it is most closely related. It is the largest species of the genus, which contains the giants of the group, and I hope to receive further specimens, for Mr. Fletcher writes about it, *in litt.*, that it "was fairly common at the beginning of November on Leu-kung-tao, and was to be found amongst long grass, in which it jumps about with long clumsy hops. Its mandibles are immensely powerful, and will shear through a piece of stout paper like a punch."

LOCAL ORTHOPTERA IN 1899.—In the early part of September last I took five *Ectobia livida*, Fabr., from oak and two from Scotch fir, in the open part of Broadwater Forest, near Tunbridge Wells. A few days before that I obtained four examples of *Meconina varium*, Fabr., from oak at Theydon Bois, and on the 23rd of the same month a living specimen of *Periplaneta australasiae*, Fabr., which a greengrocer found in some fruit that came from the Canary Islands, was given to me. I am of opinion that the insect got into the fruit from the ship. Some time ago on a patch of sugar (for moths) at Brockenhurst I found a specimen of *E. lapponica*, Fabr.—F. MILTON, 7, Chilton Street, Bethnal Green, London, E. November 9th, 1899. [It is interesting to note Mr. Milton's capture of *E. lapponica*, Fabr., at sugar. This is an addition to the list of our Orthoptera that can be taken in this manner.—M.B.]

ORTHOPTERA AT CANNES—MARCH AND APRIL 1899.—I picked up a few grasshoppers at Cannes last spring. They were only such as came in my way, and it does not at all disappoint me that Mr. Burr reports that "none of them are particularly rare." He tells me that they include *Tettix bipunctatus*, L., *T. subulatus*, L., *T. depressus*, Bris., *Acrotylus insubricus*, Scop., *Epacromia thalassina*, De Geer, *Pachytylus danicus*, L., *Acridium aegyptium*, L., and a very young larva of *Pyrgomorpha*

grylloides, Latr. *Acrotylus insubricus* is a handsome species, with scarlet underwings with a black band. They are smaller than the great scarlet-winged fellow we see in Switzerland in late summer (*O. miniata*, Pall.). *Epacromia thalassina*, to the non-orthopterist, has a very similar aspect, but has the colour of the underwings a transparent green, as of the sea. *Acridium aegyptium* is a great fellow, usually frequent enough, but this spring was very common in places, swarming in the valley of the Var; when abundant like this it is very destructive—to the young shoots of the fruit trees especially—and does much damage. The larva of *Empusa egea*, Charp., was also seen; this is a very bizarre-looking praying Mantis. Those I have kept have usually died at a moult, probably from not feeding them properly.—T. A. CHAPMAN, Betula, Reigate.

ERRATUM.—p. 74, line 33, for "*Mastax nigra*" read "*Mastax magna*."

COLEOPTERA.

Hypera elongata, Payk., confirmed as British.

By Professor T. HUDSON BEARE, B.Sc., F.E.S.

I captured under a stone in a grassy place, near Edinburgh, in July last, a *Hypera*, which, from its strikingly elongate form, I at once recognised as something new to me (careful search failed to turn up any more). On my return to London the insect was compared with the specimens in the European collection of the British Museum, and my identification of it, from the descriptions, as *elongata*, Payk., was confirmed. I have now gone carefully into the history of this insect as regards its previous occurrence in Great Britain, and am of opinion that it has been allowed hitherto to stand under very vague and unsatisfactory evidence.

It makes its first appearance in a paper read before the Entomological Society of London, in 1867, by Messrs. Crotch and Sharp, entitled "Additions to the Catalogue of British Coleoptera." In their list, number 33 is *H. elongata*, Payk., and all the information given is as follows: "I have seen one specimen only, which was so named by M. Capiomont, who is engaged in a revision of the genus, G.R.C." Rye, in "*Ent. Annual*," 1867, p. 87, refers to this record. No statement as to where this specimen came from, or to whom it belonged, is given, and its inclusion on such unsatisfactory evidence is strange. That it was *elongata*, Payk., M. Capiomont's identification guarantees, for he was then busy on his masterly revision of the genus; his paper, "*Révision des Hypérides*," appeared in the *Annales de la Société Entomologique de France*, in 1867 and 1868.

Canon Fowler, in his *British Coleoptera*, vol. v., p. 234, says "very rare, and perhaps doubtfully indigenous. In Dr. Power's collection there is a doubtful specimen from Birch wood and another from Mr. Brewer. Stephens (*Illust.*, iv., 102) says 'my specimens were from the Marshamian collection, and I have seen several that were captured near Edinburgh, 'Raehills rare, Rev. W. Little.' Dr. Sharp, however, does not recognise the species 'from Scotland.'"

The reference to Stephens is beside the mark, for Mr. Waterhouse in his *Catalogue of British Coleoptera*, 1861, p. 72, had already shown that the specimens of Stephens were not *elongata* at all, but *H.*

murinus, Fab. In fact Stephens, as was the case so often, copying from Paykull, had in vol. iv. of his *Illustrations* given a correct description of *elongata*, but had used for his exponents of the species specimens of another species altogether, *murinus*. This, of course, not only puts out of court all those in his own collection, which came from Marsham, but also the specimens he says he had seen taken near Edinburgh.

It is a pity Canon Fowler, in view of the fact that Mr. Waterhouse had disposed of these insects so long ago, gave the reference to Stephens at all. The reference to "Rev. W. Little, Raehills," given by Canon Fowler, is also apparently a reference to another species, for Murray, in his *Catalogue of Scotch Coleoptera*, 1853, p. 74, quotes *elongata* of Stephens as a synonym for *murinus*, and gives "Raehills" as one of the localities for *murinus*.

Mr. Dale recorded in the *Ent. Mo. Mag.*, xxix., p. 143, the capture of *H. elongata* at Chesil beach, and said that it agreed with exponents of this species in his father's collection, I have not seen this insect, but as Mr. Dale informs me that his father's specimens were named by Stephens, I imagine this again is not *elongata*, Payk., but probably *murinus*, Fab.

There remains now only the two specimens in the Power collection at the British Museum, neither with a known history, one is from Mr. Brewer, the other from Birch wood. Both are in a bad condition, and it is very doubtful whether either is *elongata*, Payk., though one may possibly be that insect.

Summing up, I think I am justified in concluding that this insect has existed in our catalogues up to the present without any real justification, and that my capture of it has really added a new species to the British fauna. I am inclined to think that there are other cases of doubtful insects which would prove, on exhaustive enquiry, to be existing under equally shadowy and untrustworthy evidence.

H. elongata was first described by Paykull, *Fauna Suecica*, iii., p. 236 [1798-1800]. He says it may easily be known by its elongate form, and that it occurs in Sweden, being rarer in the south. Schönherr, in *Fauna Suecica*, ii., p. 374, 1834, repeats the description, and Capiomont, l.c., gives a very complete and full description. He says it occurs in the north of Europe, England (see above), Belgium, and in the north of France.

It appears to be decidedly a northern insect, and, therefore, Scotland is the part of Great Britain where it was likely to occur if at all.

Coleoptera at Oulton Broad and District.

By E. C. BEDWELL, F.E.S.

(Concluded from p. 300.)

Tychus niger, Payk., in marsh hay. *Bythinus bulbifer*, Reich., not uncommon in marsh hay stacks. *B. curtisi*, Denny, one specimen in flood refuse. *Bryacis juncorum*, Leach, abundant in marsh hay stack. *Scydmaenus collaris*, Müll., common in marsh hay. *Fumicrus tarsatus*, Müll., abundant in marsh hay. *Anistoma calcarata*, Er., by sweeping. *Necrophorus humator*, F., in a dead crow. *N. vestigator*, Heer, two specimens in a dead toad. *N. respillo*, L., one specimen under a stone

in sandpit. *Silpha sinuata*, F., in stercore and in dead crow. *S. atrata*, L., by shaking tufts of grass and at the roots of trees. *Cholera angustata*, F., one specimen in sandpit. *C. cisteloides*, Fröhl., one in dead crow. *C. agilis*, Ill., two ♂s in flood refuse. *C. morio*, F., in vegetable refuse at sides of ditch. *C. nigrita*, Er., in flood refuse. *C. tristis*, Panz., in vegetable refuse. *C. chrysomeloides*, Panz., in dead crow, &c. *C. fumata*, Spence, in dead crow. *Hister unicolor*, L., one specimen in stercore. *H. 12-striatus*, Schr., in stercore, rarely. *Onthophilus striatus*, F., uncommon. *Subcoccinella 24-punctata*, L., not uncommon by sweeping in damp places, most of the specimens that I have taken here are darker than the type form. *Hippodamia variegata*, Goeze, by sweeping. *Adalia bipunctata*, L., *Coccinella 10-punctata*, L., *C. 11-punctata*, L., *Halysia 22-punctata*, L., and *Micraspis 12-punctata*, L., abundant. *Scymnus pygmaeus*, Fourc., by beating. *S. frontalis*, F., in flood refuse. *Chilocorus similis*, Rossi, by beating alders. *Rhizobius litura*, F., common. *Coccidula rufa*, Herbst, abundant in flood refuse, &c. *Phalacrus corruscus*, Payk., common in rejectamenta. *Olibrus corticalis*, Panz., common by sweeping, &c. *Micropeplus margaritae*, Duv., by sifting marsh hay, rarely. *Cercus bipustulatus*, Payk., commonly by sweeping sedges, &c. *Eपुरaea aestiva*, L., common. *Omosiphora limbata*, F., two specimens in fungi on elm in October. *Soronia grisea*, L., common in burrows of *Cossus ligniperda*. *Meliethes aeneus*, F., and *M. picipes*, Sturm., common. *Psammoechus bipunctatus*, F., common under vegetable refuse. *Lathridius lardarius*, De. G., abundant in haystack. *Enicmus minutus*, L., occurs in some numbers with the preceding. *E. transversus*, Ol., common. *Corticaria denticulata*, Gyll., by grubbing at side of ditch. *Melanophthalma fuscula*, Hamm, common in fungi, &c. *Telmatophilus caricis*, Ol., common in damp places. *Atomaria mesomelas*, Herbst, abundant in stacks of marsh hay. *Typhaea fumata*, L., common. *Byturus tomentosus*, F., common on flowers of buttercup. *Attagenus pellio*, L., beaten from may blossom. *Parnus auriculatus*, Panz., not uncommon in flood refuse. *Aphodius haemorrhoidalis*, L., in stercore, rarely. *A. juncetarius*, L., and *A. rufescens*, F., common. *A. porcus*, F., one specimen in stercore ovius and one flying in the sunshine. *A. inquinatus*, common. *A. prodromus*, Brahm, abundant. *A. contaminatus*, Herbst, not uncommon. *A. rufipes*, L., common. *A. depressus*, Kug., two specimens only. This species is an addition to Mr. Morley's Suffolk list. *Geotrupes stercorarius*, L., abundant. *Serica brunnea*, L., at sugar and light. *Melolontha vulgaris*, F., common. *Laeon murinus*, L., by sweeping. *Athous niger*, L., not uncommon by sweeping. *Limonius minutus*, L., by sweeping hedgerows. *Adrastus limbatus*, F., not common. *Agriotes sputator*, L., *A. obscurus*, L., *A. sobrinus*, Kies., *A. pallidulus*, Ill., common. *Dolopius marginatus*, L., by sweeping, common. *Campylus linearis*, Ol., common on alder. *Helodes minutus*, L., *Cyphon nitidulus*, Thoms., *C. variabilis*, Thunb., and *Scirtes hemisphaericus*, L., by sweeping and beating. *Lampyrus noctiluca*, L., at dribblets of sugar, &c. *Silis ruficollis*, F., by sweeping reeds; this species appears to be almost confined to a very small patch of reeds fringing a ditch, from which I have obtained as many as a dozen specimens at one sweep of the net, in other parts of the district I have only met with it singly. *Telephorus fuscus*, L., one specimen at rest on a shed. *T. rusticus*, Fall., *T. luridus*, L., *T. nigricans*, Müll., *T. bicolor*, F., and *T. flavilabris*, Fall.,

by sweeping, &c., common. *Rhagonycha fulva*, Scop., *R. testacea*, L., *R. limbata*, Thoms., common on *Umbelliferae*, &c. *Matthinus punctatus*, Fourc., by sweeping. *Malachius bipustulatus*, L., abundant by sweeping sedges, &c. *Anthocomus sanguinolentus*, F., local, by sweeping in a damp place. *Ernobius mollis*, L., by sweeping, not common. *Cis boleti*, Scop., abundant under bark. *Callidium violaceum*, L., not uncommon on and about pine palings. *Clytus arietis*, L., common, on gate posts and walls in the sun and by sweeping. *Leptura livida*, F., common on ox-eye daisies on railway embankment near station. *Grammoptera ruficornis*, F., common on may blossom, &c. *Donacia dentata*, Hoppe, abundant by sweeping sedges. *D. versicolore*, Brahm, not uncommon. *D. sparganii*, Ahr., one specimen by sweeping in August. *D. dentipes*, F., exceedingly abundant on sedges, along one short length of ditch in particular. *D. limbata*, Panz., *D. simplex*, F., common. *D. vulgaris*, Lach., by sweeping, rarely. *D. clavipes*, F., two specimens swept in cop. *D. semicuprea*, Panz., not uncommon. *D. sericea*, L., abundant. *D. affinis*, Kunze, by sweeping, not uncommon; more often than not I have taken this species away from the ditches and not like the foregoing *Donaciae* on the sedges fringing the ditches. *Lema lichenis*, Voet., by sweeping, common. *L. melanopa*, by sweeping, but by no means common. *Cryptocephalus aureolus*, Suffr., one specimen on coltsfoot; the only Suffolk record. *C. pusillus*, F., by sweeping, not uncommon. *C. exiguus*, Schneid., a pair swept in cop., in June; the only Suffolk record. *Chrysomela staphylaea*, L., not uncommon in marsh hay stacks, &c. *C. polita*, L., commonly by sweeping, and hybernating in cracks in bark, &c. *Phaedon cochleariae*, F., by sweeping, not uncommon. *Hydrothassa marginella*, L., common by sweeping and in flood refuse. *Prasocuris phellandrii*, L., abundant in vegetable refuse. *Galerucella sagittariae*, Gyll., abundant by sweeping sedges. *G. lineola*, F., not uncommon by beating alders. *G. tenella*, L., by sweeping, &c., common. *Adimonia tanaeti*, L., by sweeping reeds, one specimen only. *Longitarsus luridus*, Scop., *L. melanocephalus*, All., common. *L. pellucidus*, Fendr., by sweeping, rare. *Phyllotreta nemorum*, L., *P. exclamatoria*, Thunb., and *Aphthona nonstriata*, Goeze, by sweeping. *Sphaeroderma testaceum*, F., and *S. cardui*, Gyll., abundant on *Umbelliferae*. *Apteropeda orbiculata*, Marsh., by sifting marsh hay and occasionally by sweeping. *Mantura rustica*, L., not uncommon. *M. obtusata*, L., one specimen in very wet flood refuse in December. *Crepidodera transversa*, Marsh., *C. ferruginea*, Scop., by sweeping, common. *C. aurata*, Marsh., not uncommon. *Chaetocnema hortensis*, Fourc., and *Plectroscelis concinna*, Marsh., common. *Psylliodes chrysocephala*, L., *P. napi*, Koch, and *Cassida flaviola*, Thunb., by sweeping, not common. *C. equestris*, F., and *C. viridis*, F., common in flood refuse and by sweeping. *Tenebrio molitor*, L., one in house. *Cistela murina*, L., commonly by beating. *Lagria hirta*, L., abundant. *Orchesia micans*, Panz., several bred from a fungus on elm. *Rhinotimus planirostris*, F., by sweeping. *Pyrochroa serraticornis*, Scop., on elm logs, and by sweeping. *Anaspis frontalis*, L., *A. pulicaria*, Coste, and *A. ruficollis*, F., common by sweeping, &c. *Notoxus monoceros*, L., in sandpit at roots of grass. *Anthicus floralis*, L., common in manure pit by stables. *A. antherinus*, L., not uncommon in rejectamenta. *Meloë proscarabaeus*, L., and *M. violaceus*, Marsh., crawling along roads and paths by hedgerows. *Rhynchites*

minutus, Herbst, by sweeping. *Apion ulicis*, Forst., abundant on furze. *A. minutum*, Germ., and *A. haematodes*, Kirby, common in stack of marsh hay, &c., *A. aprieans*, Herbst, abundant by sweeping. *A. assimile*, Kirby, *A. dichroum*, Bedel, *A. radiolus*, Kirby, and *A. onopordi*, Kirby, common. *A. carduorum*, Kirby, by sweeping thistles, uncommon. *A. virens*, Herbst, and *A. pisi*, F., common. *A. erri*, Kirby, not commonly. *A. loti*, Kirby, rare. *A. tenue*, Kirby, plentiful in flood refuse. *A. pubescens*, Kirby, rare. *A. violaceum*, Kirby, *A. hydrolapathi*, Kirby, *A. humile*, Germ., common. *Otiorrhynchus picipes*, F., and *O. oratus*, L., in marsh hay, &c., common. *Strophosomus coryli*, F., by beating, &c. *Phyllobius oblongus*, L., *P. urticae*, De. G., *P. pyri*, L., and *P. pomonae*, Ol., common by beating and sweeping. *Barynotus obscurus*, F., by sweeping, rare. *Sitones hispidulus*, F., *S. puncticollis*, Steph., *S. lineatus*, L., and *S. sulcifrons*, Thunb., common by sweeping, &c. *Hypera punctata*, F., by sweeping, &c., common. *H. rumicis*, L., *H. pollux*, F., and *H. alternans*, Steph., in flood refuse, not commonly. *H. variabilis*, Herbst, and *H. nigrirostris*, F., abundant. *Orchestes quercus*, L., under oak bark. *O. alni*, L., common. *O. ferrugineus*, Marsh., several bred from an excrescence on elm. *O. ilicis*, F., by sweeping, not common. *Grypidius equiseti*, F., one specimen by sweeping. *Eriirrhinus acridulus*, L., abundant in flood refuse. *Thrynges nereis*, Payk., abundant by sweeping sedges at sides of ditches. *Dorytomus vorax*, F., common under bark. *Miccotrogus picrostris*, F., common. *Gymnetron labilis*, Herbst, by sweeping in May, one specimen. *Mecinus pyrauster*, Herbst, by sweeping, common. *Anthonomus ulmi*, De. G., commonly, whilst beating a hedge in December at dusk for the wingless ♀s of *Cheimatobia brumata*. *A. rubi*, Herbst, and *Nanophyes lythri*, F., common. *Cionus scrophulariae*, L., and *C. pulchellus*, Herbst, by sweeping sedges, &c., not common. *Coeliodes cardui*, Herbst, and *C. quadrimaculatus*, L., by sweeping. *Ceuthorrhynchus cochleariae*, Gyll., somewhat commonly by sweeping. *C. erysimi*, F., and *C. contractus*, Marsh., common. *C. chalybaeus*, Germ., not uncommon. *C. pollinarius*, Forst., and *C. pleurostigma*, Marsh., common. *C. marginatus*, Payk., one specimen in flood refuse, the only Suffolk record. *C. litura*, F., common. *Ceuthorrhynchidius floralis*, Payk., abundant. *C. melanarius*, Steph., by sweeping, one specimen. *C. troglodytes*, F., abundant. *Rhinoncus pericarpus*, L., not uncommon in flood refuse. *Eubrychius velatus*, Bech., one specimen in flood refuse. *Limnobaris T-album*, L., commonly by sweeping. *Balaninus salicivorus*, Payk., not common. *Magdalinus armigera*, Fourc., one specimen by sweeping. *Bruchus rufimanus*, Boh., one specimen by sweeping. *B. villosus*, F., abundant on broom in sandpit.

I beg to acknowledge my indebtedness to Mr. Claude Morley for his kindly assistance in identifying most of the foregoing captures, but for his help these notes would most probably never have been compiled.

QUEDIUS TRISTIS, GRAV., IN SCOTLAND.—With reference to Professor Hudson Beare's note in the September number of this magazine, I should like to say that in the course of the past twelve years I have found this beetle in a number of localities in the Edinburgh district, among them being Arthur's Seat. So far back, however, as 1876, it

was recorded as "common on Arthur's Seat," by the late W. A. Forbes (*Scottish Naturalist*, vol. iii., p. 816).—WILLIAM EVANS, Edinburgh. November 11th, 1899.

COLEOPTERA AT WICKEN IN 1899.—Although the very dry hot summer, had a bad effect on insect life in most localities, in the Fens, on the contrary, it seemed to act in quite a different manner and rather to increase the number of specimens than the reverse, at any rate such was my experience with the Coleoptera. However dry the summer may be, the Fens, of course, have always plenty of moisture so that the extra heat is not sufficient to dry things up. Of the usual Fen species nearly everything was present—*Oberca oculata* was again observed, *Lixus paraplecticus*, was abundant and is still spreading its range from its original feeding ground. The large poplar beetle, *Saperda carcharias*, which I have not seen for five years, was this year fairly abundant both in the Fen and in the village, an exciting morning's hunt after it in the latter locality with Mr. S. Bailey proved very successful, the beetles in many instances occurring so high up in the trees that a ladder had to be called into requisition. Another Longicorn, *Agapanthia lineatocollis*, was also present in fair numbers, most of the specimens being a melanic form which seems to be rather peculiar to Wicken Fen. *Stenopus sulphureus* was there in greater profusion than I have ever noticed it before. Several specimens of *Oodes helopioides* turned up on the peaty banks of small pools. Other things taken chiefly by sweeping were—*Chrysomela graminis*, *Melasoma populi*, *Antherophagus nigricornis*, *Gymnetron noctis*, *Hygronoma dimidiata*, *Anthocomus rufus*, *Coccinella hieroglyphica*, three specimens, one being the black aberration, &c. In the case of the waterbeetles, the fact that many of the small pools were nearly dry, and that those which most years are connected by water, were isolated, was a decided advantage from a coleopterist's point of view, as they were thus rendered easier to get at. The work itself, however, was by no means the lightest or most pleasant, for, the pools being so shallow, the waternet got full of very offensive black mud at every drag and, in consequence, I got black from head to foot before the task was finished; added to this were an intense heat and steamy atmosphere, so that I felt that I deserved what I was able to get. A good many small pike were landed out of the mud, some quite a foot long. The best capture undoubtedly was a fine series of *Dytiscus dimidiatus*. This grand water-beetle has not been taken in the Fens for many years, with the exception of one male taken by my friend Mr Bouskell about three years ago. Canon Fowler writes (*Coleoptera of the British Isles*, vol. i., p. 206): "This species used to be locally abundant in the Cambridgeshire and other Fens, but of late years has become exceedingly rare. The last specimen taken in Britain was found three or four years ago (1888) in Askham Bog, York, by the Rev. W. C. Hey." I also took nine specimens of the local *Dytiscus circumcinctus*, three of the females being the form with the smooth elytra, *Dytiscus marginalis* and *D. punctulatus* were both common. *Hydaticus transversalis* turned up, the first time I have seen it at Wicken. The large *Hydrophilus piceus* was very plentiful, I took a dozen specimens in a morning and let as many go, I have some of them alive still, having fed them with vegetable marrow, &c. Other water-beetles were *Rhantus exoletus*, *Copelatus agilis*, *Colymbetes fuscus*, *Acilius sulcatus*, *Hydroporus pictus*, *H. granulatus*, *H. lepidus*, *H. lineatus*, *H. dorsalis*, *H. palustris*, &c. I

must mention that I paid two visits to Wicken Fen in August, the first from 5th-7th and the second from 21st-24th, and it was during the latter that the water-beetles were so much in evidence.—HORACE DONISTHORPE, 58, Kensington Mansions, W.

RARE COLEOPTERA IN 1899.—Whilst looking through Mr. Bates' fine collection of British coleoptera the other day, he pointed out to me several very rare beetles he had received from the New Forest this year, and which are well worthy of record. Of these the two best were *Tropideres sepicola*, F., and *Ernobius abietis*, F. The former of these very scarce insects was once taken before by Mr. Plant, of Leicester, in a decayed oak-bough from Buddon Wood, August 18th, 1856 (*Ent. Annual*, 1857, p. 84). Of the latter Canon Fowler writes (*Col. Brit. Isles*, vol. iv., p. 193): "I think that it is quite possible that we do not possess the true species as British; at all events it requires more confirmation." Stephens records it from Scotland and Wales, and there is a doubtful specimen in the Power collection. Other things worthy of mention were *Telleius dilatatus*, F., the hornet's nest beetle (it will be remembered that Mr. Gorham took a pair in the Forest last year) and a very fine specimen of *Agrilus sinuatus*, Ol. This has been quite a year for very rare beetles, and some that have not been taken for many years have turned up. Mr. Walker tells me he has just taken the beautiful *Callistus lunatus*, F., in his district. Mr. Day captured a specimen of the very scarce *Lebia crux-minor*, L., Carlisle (*Ent. Mo. Mag.*, xxxv., p. 145); Professor Beare has taken *Hypera elongata*, Payk., in Scotland, on which interesting insect there is a note in the current number of the *Record*. I had the pleasure of turning up *Dytiscus dimidiatus*, Berg., at Wicken (*ante*, p. 339) and I find that an *Agathidium*, which I took near Lyndhurst on a powdery fungus on a beech log last June, and had put aside for identification, is a ♂ of the very rare *A. confusum*, Bris., (*clypeatum*, Sharp). Mr. E. A. Waterhouse and Mr. Newbury have confirmed this determination.—IBID.

NOTES ON LIFE-HISTORIES, LARVÆ, &c.

DESCRIPTION OF HERIALID LARVA.—GORINA DESPECTA, "WALK."—LOCALITY: Palmerston North, New Zealand. OVA, laid March 5th, 1899, hatched April 3rd, 1899. LARVA, examined* July 12th, 1899. Length: Eleven-sixteenths of an inch. Colour: Head medium mahogany, not glassy; dorsal plates of thoracic segments brown, that of prothorax paler at sides and narrowly darker at anterior edge; segments (abdominal) are dark greenish really due to the contents of the alimentary canal showing through semitransparent whitish skin; legs pale brown and glassy; prolegs white; tubercles black; hairs brownish-black; spiracles brownish-black. The larval skin may be described as prickly; the hairs of tubercles are like bristles slightly curved and thorny with minute blunt thorns, not unlike those on a rosebush twig. Shape: Cylindrical, rather flat ventrally. Dorsal view: Head evenly rounded on all sides except posterior; prothorax is shorter than the other segments all of which appear to be same size, except the 9th abdominal and the anal segments which taper somewhat. Anterior trapezoidals close together; posterior trapezoidals remote on all except the 8th abdominal segment,

* Examined with a watchmaker's eyepiece.

where they form a square, *i.e.*, equidistant apart; on the 9th abdominal the posterior trapezoidals are closer together than are the anterior trapezoidals, this evidently due to the posterior tapering of the segment, on this segment also two other tubercles on each side become more dorsal than lateral; on the anal segment the posterior trapezoidals are closer together, in fact, all the tubercles are crowded posteriorly; all the trapezoidals have only one hair*; so far as I can distinguish there are four simple hairs on the head in position corresponding with the trapezoidals of the segments, but these hairs are very much finer than those on the segments; some half dozen hairs are distributed round the head; on the narrow dark margin of the prothoracic dorsal plate is a series of four hairs each side, equidistant, extending downward to the lateral edge of the plate, laterally there is another hair closely posterior to the lowest of the series; about the middle of the plate are two small white-rimmed tubercles on each side, the anterior being more lateral and really the highest of a series of three tubercles extending to the middle of the lateral edge of the plate. The dorsal area of the meso-subsegment is covered by a plate on which I can distinguish two hairs at either side. The trapezoidals (i and ii) commence as such on the mesothorax, though much larger than the same on the abdominal segments. *Lateral view*: Prothorax, anterior to the spiracle are two small white-rimmed tubercles with a single hair, one hair at the base of the legs, and several hairs (spines?) at the several joints of the legs projecting downwards. Mesothorax, two small tubercles with one hair each (anterior and posterior), other hairs of prothorax present. Post-thorax, supraspiracular tubercle large with three hairs; posterior and anterior subspiracular tubercles with one hair; legs as prothoracic. On all the abdominal segments the supraspiracular tubercle is large and bears two hairs; the subspiracular tubercles small, each bearing one hair; one hair (subprimary) above the base, and three hairs round the base of prolegs, the prolegs are on 3rd, 4th, 5th, 6th segments, on the other segments the leg hairs present. The subspiracular (posterior and anterior) tubercles coalesced on the 1st abdominal, forming a large tubercle bearing two hairs (perhaps an accidental coalescence). Dorsally posterior to the supraspiracular of the 3rd abdominal segment are three single hairs (on subsegment), I could not find them on any other segment. *Ventral view*: Hooks of the prolegs all round the ventral margin, which is pear-shaped with the smaller end inwards. *Habits of the larva*: Subterranean during daytime, feeding above the surface at night, at the roots of grasses. The habits make it difficult to obtain a connected description of each ecdysis, and as my microscope was not available at the hatching I failed to get a description of 1st instar, this I will publish if possible this season. During last season I obtained four species of New Zealand *Gorinas*, three of which deposited ova, one species, *Gorina umbraculata*, as many as 1500, of which I counted 1000 and estimated the balance. With the same success this season, I hope to give descriptions of ova and larvæ of several species, so far as I know no species among the New Zealand *Hepialidae* have been structurally described.—AMBROSE QUAIL, F.E.S.

NEWLY-HATCHED LARVA OF SATYRUS HERMIONE.—Length $\frac{1}{16}$ in.; head large; body tapering to two tail points; general colour pale slaty-grey

* Observed under microscope, one-inch objective.

with a nankeen tint, perhaps derived from the pale brownish stripes. These are dorsal bands, a slightly darker lateral supraspiracular band, and a very narrow one just below the posterior trapezoidal tubercles. Below the spiracle the colour is paler, forming an almost white subspiracular or marginal line. The abdominal segments have five subsegments (one large anterior one and four smaller ones behind it); tubercle i is on the 1st, ii is on the 4th (and in the finer intermediate line), iii is on the 2nd subsegment (and in the broad dark lateral line). The spiracles are black. The head has four black spots on either side above; eye-parts below black; there are a few very minute brown spots on and round the superior angle of the clypeus. Tubercles iv and v are below the spiracle, one as much in front as the other behind, the anterior is the lowest and largest. The hairs are very short, thick, and rather clubbed, those on the 10th abdominal, and especially on the two tails, are longer, but still thick and clubbed. The head is rough, with numerous shallow pits. There are two tubercles (an anterior and posterior) at base of prolegs. The prolegs have seven hooks.—T. A. CHAPMAN. *September 5th, 1899.*

EGGS OF LEPIDOPTERA.—*Satyrus hermine*. Small for the size of the butterfly, white when first laid (August 25th), becoming leaden-coloured before hatching (September 5th), somewhat oval in outline, but blunter towards the base and more slender towards the apex; the vertical ribs, 23 in number, well-developed; the transverse ribs fainter (Eggs laid by ♀ captured at Fontainebleau, August 25th, 1899). To this Chapman adds: "With the two young larvæ (described above), are the remains of two eggs, one a mere mass, the other nearly a third of the shell, but in neither case with the apex and micropyle. Judging from these the eggs would appear to have been 1.1mm. high, not quite so broad, nearly spherical but tapering a little upwards, with about 23 very rounded ribs, but with the bottoms of the grooves very sharp; the secondary ribs continuous, the base circular and somewhat depressed."—J. W. TUTT.

Crambus geniculeus.—4mm. long, .25mm. wide; ends very square and truncate; the micropylar end slightly narrower than the other. Rests on its long side, but if fixed up on the narrow end, it might be described as an upright egg, with 16-18 blunt ribs, anastomosing at top (and sometimes short of it), and with 16 secondary ribs crossing them, the secondary ribs seem to be in continuous lines and not in alternate ones, and fail at the base (nadir of micropyle). At micropylar end the ribs form a smaller network, but without any obvious micropylar rosette. The colour is at first white, then pale yellow, lastly of a fuller yellow with bright scarlet ribs, giving the egg as a whole a rich reddish-orange colour. (Described September 5th from eggs laid August 24th, 1899, by ♀ captured at Fontainebleau).—T. A. CHAPMAN.

Erebia stygne.—The egg is of a pale whitish-yellow tint; forms a truncated cone, the apical diameter rather less than the basal, the height just a shade more than the basal width, hence slightly oval; vertical ribs not particularly strongly marked, round-edged, 26 in number, some anastomosing before reaching the apex; the micropylar area is a small apical depression (not the whole flattened top as in *M. epiphron*), surrounded by a fine reticulation which the ribs form after passing the shoulder of the egg. There are faint wavy lines crossing

the vertical ribs although the power is too low to show any real transverse ribbing. [Described August 12th from egg laid August 10th, 1899, by a ♀ captured at Evolène.]

Ctenonympha satyricæ.—The egg is of a bright green colour, and forms a short squat cylinder, slightly rounded at micropylar end and base; no noticeable ribbing (surface seems smooth but is much obscured by scales, &c.); length very little more than width. [Described August 15th, from egg partly extruded from ovipositor of ♀ captured on the Bricolla pass, August 14th, 1899.]

Epinephle lycæon.—The egg is pale straw-yellow in colour, conical, much narrower at top than bottom (and is such that a vertical section would about form an isosceles triangle with the angles rounded off); the edges rounded; 21 vertical ribs rather sharp-edged, wide at base, anastomosing somewhat irregularly at some distance from the micropyle and forming an irregular ribbing around the latter, no transverse ribbing to be seen with power at disposal. Vertical height about equal to basal diameter. (Described August 12th, 1899, from an egg laid same date by a ♀ captured at Evolène).—J. W. FULT.

LARVA AND PUPA OF MELAMPIAS EPIPHRON.—Some time ago, when seeking for information as to the habits and appearance of *M. epiphron*, with a view to breeding the species, Mr. Maddison gave me the following:

Larva green, with dark lines and a white stripe on the sides; it feeds on *Poa annua*, *Festuca ovina*, and other grasses, and should be sought for either with a lantern or by sweeping after dusk, as it feeds at night. It is usually full-fed about the end of May or beginning of June, this, of course, depending somewhat on the season, but in an ordinary year the end of May would be the best time to work for it.

I have no idea whether Mr. Maddison obtained his information from books or from personal observation, nor whether the description was made from the British or an European form of the species, if from the latter then the former must differ from it both in the larval and imaginal stages. Acting on the above information I went on May 29th to a well known locality for the species, armed with lantern and sweeping-net, and arrived about an hour before sunset; with very close searching I found two larvæ which I judged (and afterwards discovered) were nearly full-fed; I then commenced with the sweeping-net, and although I worked till after dark, obtained nothing more. On May 31st I went again, starting an hour or two earlier, so as to have more daylight, and although I went on hands and knees, and even pulled up one or two large patches of grass, found nothing except a number of larvæ of *Nemeophila plantaginis*, which began feeding at exactly 5 p.m. I propose, therefore, to give a description of the larvæ obtained, and of the pupæ into which they ultimately changed, and it will be seen that my larvæ did not agree with Mr. Maddison's description, nor does the time of feeding correspond with that given, for my larvæ were found feeding before sunset, and until they were full-fed they continued to feed through the day, whilst I never found them to move during the night.

LARVA.—Colour rich apple-green, dorsal line darker green, sub-dorsal stripe pale whitish-green, stripe below spiracles pale whitish-green; dorsal area, except line, paler than rest of body; ventral area and prolegs, green; mouth, brownish; legs tipped with brownish; head, green. Body obese. Head small, last three segments taper rapidly to the pointed anal flap. Habits sluggish, when alarmed con-

tracts the ventral area and falls off food-plant, but does not form a ring; crawls very slowly; length when full grown about three-fourths of an inch.

On June 3rd both larvæ spun up, in a very slight web composed of apparently just a few single strands of white silk, hardly visible to the naked eye, and on June 6th pupated without any attachment, lying in their webs on their backs in a horizontal position.

PUPA.—Colour green, abdomen yellowish-green; markings brown; a brown central stripe over head and thorax, nine or ten brown stripes on wing-cases; antennæ and legs brown; five rows of paired brown specks (tubercular points), and one row (the lowest on each side) of single spots, also numbers of dots sprinkled all over the abdomen, slightly thicker on the ventral area. Length $\frac{7}{16}$ in., thickness barely $\frac{1}{16}$ in.

The above description was made from one of the pupæ, the other one being slightly more whitish on the dorsal surface of the abdomen; soon afterwards both turned slightly whiter. On June 11th the pupæ commenced to darken; on the 13th the pupæ were nearly black; on the 14th a ♀ emerged, 15th a ♂ emerged, thus proving that the larvæ were what I had taken them for, viz., *M. epiphron* var. *cassiope*.—H. A. BEADLE, 6, Station Street, Keswick. October 11th, 1899.

VARIATION.

DIMINUTIVE *MACROGLOSSA STELLATARUM*.—Miss Doris Green, daughter of Mr. J. F. Green, of Blackheath, captured a specimen of *Macroglossa stellatarum* on September 8th, 1899, at Sandgate, Kent, measuring only 30mm. from tip to tip of its forewings. As this is the smallest example I have seen of this moth it appears worthy of notice. Thanks to the liberality of the captor this specimen has found a resting-place in my collection.—B. A. BOWER, F.E.S., Lee. October 19th, 1899.

ABERRATION OF *CYANIRIS ARGOLUS*.—This spring I captured a ♀ specimen of *C. argiolus*, in which the ordinary violet-blue colour of the wings was replaced by a bright metallic blue, very similar to the colour of *Polyommatus bellargus*.—S. G. HILLS, Public Library, Folkestone.

VARIATION OF *EUPITHECIA PULCHELLATA* WITH DESCRIPTION OF VAR. *HEBUDIUM*, n. var.—During July, 1898, whilst staying on the west coast of Scotland, I collected on one of the smaller of the Inner Hebrides a bag of foxglove flowers containing larvæ of *Eupithecia pulchellata*, and from these emerged in due course a magnificent series of forms quite different from any I have ever seen. The whole of the specimens are much darker than our southern types, and this darkening is brought about by the bands, which, in the type, are bright chestnut, being brown of several shades in the different specimens. The extreme form, which comprises about 20 per cent. of the whole, is so distinct from the type of this usually constant species that I would propose for it the varietal name of *hebudium*, n. var., and would describe it as follows:

The transverse bands which in the type are chestnut-coloured, are, in this variety, very dark brown, of a tint which artists would call "cold sepia." They are much more distinct, and about half the width of those in the type, and the space left by this reduction of width is white, the result is a decidedly grey-looking insect.

The island on which the larvæ occurred is almost treeless, and *E. pulchellata* rests upon the rocks, which are grey, and is thus protected by its environment.—W. G. SHELDON. September, 1899.

ANTHROCERA TRIFOLII AB. *OBSCURA*, TUTT.—We observed recently that Assmann in his *Abbild. und Besch. der Schmett. Schles.*, p. 10, pl. ii., fig. 8c, describes and figures excellently an example of *Anthrocera trifolii* ab. *obscura*, two examples of which were captured by Dr. Wocke in the neighbourhood of Trebnitz. These and Mr. Corbin's example [*ante*, p. 247 (by error 249)] should be added to those already recorded in Tutt's *British Lepidoptera*, vol. i., p. 487.—J. W. TUTT.

NOTES ON COLLECTING, Etc.

ENTOMOLOGICAL PINS.—I am not quite sure when the change came in, but I suppose it was about ten years ago that it became fashionable to use No. 9* pins for insects which we previously impaled on No. 15. Generally speaking, I think I am correct in saying that smaller pins are used all round than was the case at the period just alluded to. The great—and to my mind the only—advantage gained is that we see more of the insect and less of the pin when the specimens are set up. This is, no doubt, a great improvement, but I doubt whether it is counterbalanced by the additional danger incurred in moving the insect, especially as the specimen is nowadays generally pinned half-way up the pin. Another difficulty is that, although most of us older collectors have no objection to pin *Strenia clathrata* with No. 9, we are in doubt as to what pin to put through *Cidaria russata* or *Pamphila sylvanus*. I certainly prefer No. 15 for these two last species. Again take *Xylophasia polyodon* (or any insect of that size): granting that No. 8 is too small, are we to use 17 or 9? Then what would you use for *Euchloë cardamines*, 8 or 15? I consider 8 too thick to look well, and much prefer 15 which (of Tayler's make) is by no means a flimsy pin. But the greatest error of all, to my thinking, is to pin a "pug" like *Eupithecia linariata* with No. 10. It gives the insect a very clumsy appearance compared with the same species when pinned with No. 18, which pin, I feel certain, is quite large enough for many Tortrices and Micros (such as *Depressaria*) which are generally pinned with 10. To decide what pin ought to be used for different species is the greatest of all the puzzles encountered by the tiro in entomology, and I think the ventilation of the subject in your columns would be of much interest and advantage, even if it should not lead to any definite result.—(REV.) GILBERT H. RAYNOR, M.A., Hazeleigh Rectory, Maldon. September 8th, 1899.

ACHERONTIA ATROPOS IN KENT.—Early in August a friend sent me a nearly full-fed larva found in his garden at Ewell, near Dover, which, after forcing, has emerged perfect.—S. G. HILLS, Public Library, Folkestone.

PORTHETRIA DISPAR AT LARGE.—Last July I asked the porter here to get me some hawthorn, which he did from a hedge a little way out of the town. On his bringing it me, I noticed on it a caterpillar which was new to me, and which I was careful to isolate. It spun up, and when it emerged it proved to be a ♂ *Porthetria dispar*. It is very large, and very dark, not at all like any of the "domestic" kind I have in my cabinet.—IBID.

MACROGLOSSA STELLATARUM IN SUFFOLK AND ESSEX.—*M. stellatarum*

* The sizes mentioned are those of Messrs. D. F. Tayler's pins.

has been very plentiful here this year. Their first appearance occurred in the spring when some numbers were seen. I subsequently found some of the larvæ feeding on different species of bedstraw on July 12th, 19th, 27th, 29th and 30th. At Henny, Essex, a small parish near this place, I took six larvæ on July 18th and two more on July 20th, also feeding on bedstraw. They commenced to pupate the last week in July, and continued to do so until the end of the first week in August. They spun a very slight silken cocoon, sometimes amongst the food plant at others on the surface of the earth. Whenever possible they incorporated some of the earth with the silk. The first one emerged on July 29th, and they continued to emerge almost daily until August 15th, on which day the last one made its appearance. They all emerged between 8.30 a.m. and noon, but most of them between 9 a.m. and 10.30 a.m. I believe the larvæ were very abundant in July and August as, in many places I searched, the bedstraw appeared to be much eaten, but being chiefly nocturnal feeders they are not very readily found. Those which I obtained I took between 6 p.m. and dusk. I never remember the various species of bedstraw being in such profusion as it was during the summer months. The hedgerows and banks were quite gay with their white blossoms. The moth was also exceedingly abundant the first week in September. It was to be seen in every garden and was also constantly flying along the streets of this town. They were undoubtedly the progeny of those that appeared in the spring and not fresh arrivals. All the specimens which I caught appeared to have only just emerged as they were in excellent condition. On fine days they may still occasionally be seen, I observed one on November 9th hovering over some flowers.—EDWARD RANSOM, Sudbury, Suffolk. November 10th, 1899.

ABUNDANCE OF LARVÆ OF *CHOEROCAMPA ELPENOR*.—The larvæ of *C. elpenor* have again been very plentiful this year. Some of them were nearly full-fed as early as July 28th, while others were still very small. The green variety of the larva was nearly as abundant as the dark form. Some ova which I found hatched on July 14th.—*IBID.*

SPHINX CONVULVULI IN SUFFOLK.—I recently saw a specimen of *S. convulvuli* which was caught here about the middle of September.—*IBID.*

OVIPOSITION OF *LASIOCAMPA QUERCIFOLIA*.—On August 9th I found three ova of *L. quercifolia* at Henny, Essex. They were deposited on a species of willow, on the underside of a leaf, quite close together and at the extreme end of the leaf. They hatched on August 15th.—*IBID.*

LEPIDOPTEROUS LARVÆ AT TREACLE.—With reference to Mr. J. C. Dollman's note (*ante*, p. 308) it may perhaps be of some interest to record that I have several times during the past two seasons seen a pale brown Noctuid larva at treacle, and I also saw a larva of *Spilosoma lubricipeda* at the "sweets" this year. Mice are not uncommon visitors, but I was somewhat surprised at seeing a hedgehog feasting on the trillings on October 16th, at Birch wood, in 1898.—F. M. B. CARR, 48, Handen Road, Lee, S.E. November 16th, 1899.

ACHELONTIA ATROPOS IN 1899.—I had one female specimen emerge on October 7th last, and another on October 18th. They were both perfect and veritable squeakers. They were not forced, I simply kept the pupæ indoors on cotton wool. They were from Dover pupæ.—C. W. COLTHEUP, 127, Barry Road, East Dulwich, S.E. November 22nd, 1899.

ODONESTIS POTATORIA LARVÆ HIBERNATING A SECOND WINTER.—I have a caterpillar of the above, which I took with others in May last, at Chichester, which were nearly half-grown, having hibernated through last winter. Some died whilst others fed up and the imagines duly emerged, but the caterpillar in question fed very slowly, and since September 28th has eaten nothing. It is perfectly healthy-looking, and its body firm. It has now been dormant nearly two months. Is this not a singular occurrence?—*IBID.*

MALACOSOMA NEUSTRIA IN 1899.—I have taken the caterpillars of this species at Snodland, near Rochester, Portslade, Folkestone, Hythe and Chichester. Imagines emerged from July 19th, 1899, to August 1st, 1899.—*IBID.*

NOCTUA DITRAPEZIUM LARVÆ COMMON ON HAMPSTEAD HEATH.—It is several years ago now since I first bred *Noctua ditrapezium* from larvæ taken on Hampstead Heath, but then it was only one or two moths each season. Last year I was more fortunate, breeding just two dozen imagines, but this season, 1899, the larvæ were quite common. I have bred more than forty imagines and my friend Mr. Riches about three dozen; we also know of other collectors who have been breeding the insect from larvæ taken on the heath. The larvæ seem very general feeders, we have found them on birch, apple, whitethorn, willow, bramble, bracken, and even stinging-nettles. The best time to look for them is about midnight, especially if the night should be a windy one. We have found more larvæ on stormy nights and on the more open and exposed parts of the heath during the month of May.—*W. A. SOUTHEY, 51, Crossley Street, Liverpool Road, N.*

COLLECTING LEPIDOPTERA IN 1899.—I did not really start the season until May, except for a few evenings at willow, and these were without much success, as the nights were so cold. Insects have seemed to emerge very erratically this year, and larvæ were terribly stung. Larvæ of *Apamea ophiogramma* were very common this year in the garden, not so *Plusia moneta*, however, of which I only got one. I think the cold must have killed a good many, as I found traces of others. *Cucullia chamomillae* occurred again this year; I captured six. A visit to Lyndhurst early in June did not produce such good results as usual, beating was very slow work. Larvæ of *Zephyrus quercus* were common, also those of *Ayrotis agathina* (which have since hatched well). *Lasiocampa trifolii* fairly plentiful on the heaths, also *Anarta myrtilli*, *Selidosema plumaria*, *Noctua neglecta*, *Eupithecia nanata*, *Pachycnemis hippocastanaria*, a few *Catocala promissa* and *C. sponsa* off the oaks, also *Asphalia ridens*, *Nola strigula* (3), *Amphidasys prodromaria*, *Ennomis erosaria*. Nothing came to sugar worth mentioning, while *Macaria alternata*, *Hypsipetes impluviata*, *Eupisteria heparata*, *Ligdia adustata*, *Drepana falcata*, *Cidaria russata*, *Epione advenaria*, *Lithosia mesomella*, &c., flew at dusk. One ♂ *Stauropus fagi* on a tree trunk, and cases of a Psychid (I think *Taleporia tubulosa* (*pseudobombycella*)), were found on tree-trunks, logs, and bracken. I bred a large number of *Porthesia chrysorrhoea* from Southend larvæ. I had a week at the Broads in August; we were late for *Nonagria cannae*, but got a few between us. The moorhens had pecked out some ten examples from every dozen pupæ, whilst the attacks of ichneumonids, &c., leave one in doubt as to how the insect can possibly exist. *Leucania brevilinea* was fairly common at light, also *Tapinostola fulva*, *Coenobia rufa*, *Nonagria cannae*, *Hydroecia*

micacea (1), *Helotrophia fibrosa* (1), and *Viminia albovenosa* (3) (these must have belonged to a second brood), *Phibalapteryx vittata* (*lignata*), and *Cidaria testata*, whilst *Calamia phragmitidis* was very scarce. Larvæ of *Papilio machaon* were fairly common, also *Halias chlorana*, *Cidaria testata*, *Saturnia paronia*, *Viminia albovenosa*, *Choerocampa elpynor*, &c. I obtained a fair number of *Micros*, but have not named them yet. On the whole, I think it has been a very fair season, considering the weather. *Macroglossa stellatarum* is swarming about here.—H. M. EDELSTEN, F.E.S., The Elms, Forty Hill, Enfield.

LEPIDOPTERA OF SOUTH-EAST ESSEX.—This has been the worst season for Noctuids I have experienced in this district. From the first week in July sugar has not only not paid, but has, on many occasions, not attracted even one moth. As a set-off against this almost total failure of sugar I had the good fortune to meet with a few good species, some of them in considerable numbers. I think I have seen more specimens of the following insects than in any previous year: *Timandra amatoria*, *Aithena luteata*, *Macroglossa stellatarum*, *Pyrameis atalanta*, *Leucania obsoleta*, *Agrotis corticea*, *Cidaria pyraliata*, *Eupithecia plumbeolata*, and *E. subnotata*, *Phytometra viridaria*, *Roxana arcuana*, *Dasycera olivierella*, *Acontia luctuosa*, and *Homoeosoma binaevella*. The following notes will, I hope, prove not uninteresting: February 19th, *Diurnea fagella*, ♂ and ♀ emerged; April 4th, *Asphalia flavicornis*, at Eastwood. On the 9th, I boxed, at Benfleet, a specimen of *Epigraphia steinkellneriana*, which had fluttered from the bottom of a quick hedge and settled on a grass blade. 16th, *Ephippiphora foeneana* larvæ, common in roots of mugwort at Shoeburyness, *Dicrorampha petiverella*, in yarrow. May 7th, mines of *Bucculatrix maritima*, not uncommon in leaves of sea-aster, at Benfleet. 20th, cases of *Coleophora conspicuella*, common on *Centaurea nigra*, at Benfleet, those of *C. alcyonipennella*, scarce. 22nd, puparia of *Sesia culiciformis*, protruding from birch stumps, at Eastwood. 28th, a friend was kind enough to invite me to visit a locality a few miles out of this district where *Calymnia pyralina* had occurred, a number of *Calymnia* larvæ were beaten out, from which I bred early in July *C. pyralina* (3) and *C. affinis* (3), cases of *C. badiipennella* were found on elm, *Coleophora rimitella* and *Depressaria conterminella*, on osier. 31st, *Hylophila prasinana*, bred. June 3rd, *Elachista albifrontella*, on a colt's foot leaf, at Southend. 4th, *Bucculatrix ulmella* and *Zonosoma porata*, out of oak, at Eastwood. 6th, *Cryptoblabes bistrixa*, from larvæ beaten at Eastwood and Hockley. 7th, *Schoenobius gigantellus*, flying over reeds, at Pitsea. 11th, *Catoptria albersana* and *Drepana lacertinaria*, at Eastwood. 15th, *Ceophora tripuncta*, at Prittlewell. 17th, *Earias chlorana*, netted, also a larva of *Lithosia lurideola*, on a fence, at Benfleet. 22nd, *Amphidasys betularia* (old type), from Hockley larvæ. On June 22nd I found a brood of larvæ of *Grammesia trigrammica*, the most sluggish larva I have ever attempted to rear. June 23rd, *Ephestia semirufa*, in Southend. 25th, *Teleia luculella*, *Incurvaria oehlmanniella*, *Hedya neglectana*, and *Erastria fasciana*, at Eastwood. Moths very common on tree trunks. 29th, *Ceophora flavifrontella*, netted at Eastwood. *Rusina tenebrosa*, *Dipterygia scabriuscula*, and *Euplexia lucipara*, at sugar. 30th, *Eupithecia linariata* and *E. absinthiata* bred Southend larvæ. July 1st, *Anticlea rubidata*, at Prittlewell. 2nd, *Hecatera serena*, at Eastwood. 4th, *Melanippe hastata*, larvæ emerged from Eastwood ova and sleeved on birch.

Eupoecilia affinitana, emerged, *Cossus ligniperda*, at Pitsea. 8th, a solitary larva of *Pyrameis cardui*, at Westcliff. *Cecophora lunarella*, on railway fence, at Pitsea. 9th, *Hedya ocellana*, bred from hawthorn. 10th, *Anacampis taeniolella*, flying freely over *Lotus*, at Eastwood, *Penthina ochroleucana*, netted. 12th, *Sophronia parenthesella* and *Nemeophila russula* ♀, at Eastwood. A few ova were deposited by the latter, the larvæ resulting from which will hibernate quite small, which is, I believe, usual; J. B. Hodgkinson (*Entomologist*, vol. vi., p. 111) speaks of three broods in a year, and there are, I believe, other records of rapid feeding up and emergence of this species. July 14th, larvæ of *Macroglossa stellatarum* on *Galium verum*, at Benfleet, *Larentia didymata*, netted at Prittlewell. 15th, a visit to the *C. pyralina* locality in the hope of getting a good series of that insect at sugar was very disappointing. Not a single moth came to the bait. I netted *C. pyralina* (1), *Angerona prunaria* (1), and *Melanthia bicolorata* (1). 17th, larvæ of *Chocrocampa porcellus* on *Galium verum*, at Benfleet. 19th, *Tachypitilla pupulella*, bred from aspen. 21st, *Crambus pinellus*, at Benfleet. 23rd, *Eupithecia oblongata*, bred from last year's ragwort—a late emergence. 25th, *Cyaniris argiolus*, seen at Southend; rather common at Prittlewell. 29th, *Acidalia rusticata*, not, I fancy, hitherto reported from Essex, occurred, but was very local. During last winter I was permitted to examine a beginner's small collection, which contained, among other good things, two specimens of this species, but for this, I doubt if I should have found this insect, *Lithosia griseola*, flying at dusk. 31st, *Argyrolepis badiana*, *Cyaniris argiolus*, and *Apatela areris*, at Shoeburyness. August 1st, a fine *Lasiocampa quercifolia*, on the frame of a gas lamp, Southend. 5th, *Semasia rufillana* and *Grapholitha nisella*, netted at Pitsea. 7th, *Leptogramma literana*, on a shed, near Shoeburyness. *Phibalapteryx vitalbata*, beaten. 9th, a few *Gracilaria auroguttella*, bred from *Hypericum*, gathered at Shoeburyness. 19th, larvæ in umbels of *Daucus carota*, from which I hope to breed *Spilodes palealis* next season. They agree with Mr. Porritt's description (*Entomologist*, vol. xii., pp. 17-18). Larvæ of *Earias chlorana* and *Peronea hastiana*, on osier. August 20th, *Ochsenheimeria birdella*, flying freely about 1 p.m., at Shoeburyness. 25th, *Catoptria hypericana*, emerging in some numbers, *Selenia bilunaria*, a partial third brood, *Eupithecia assimidata*, in Southend, a few larvæ afterwards found on hop. September 3rd, *Zonosoma punctaria*, *Ephippiphora similana* and *Gelechia mulinella* (very worn), netted at Eastwood, *Pyrameis atalanta*, common on heads of scabious skirting path in wood near Hadleigh. August 17th-24th, *Cucullia asteris*, larvæ on sea-starwort, near Shoeburyness, and swarms of larvæ of *Hadena trifolii* on *Chenopodium maritimum*. October 3rd, *Peronea hastiana* and *Eubolia cervinaria*, emerging.—F. G. WHITTLE, 3, Marine Avenue, Southend.

THE FOOD-PLANT OF CABERA ROTUNDARIA.—ERRATUM.—I do not know whether my writing was less legible than usual, but my article in the last number contains several printer's errors, one of which (*ante*, p. 290) involves an error that it is well not to perpetuate. The larva of *Cabera rotundaria* was beaten from "alder," not "elder."—W. S. RIDING, M.D., Buckerell, Devon.

LEPIDOPTERA IN THE AUTUMN OF 1899.—*Acherontia atropos* has occurred in this district this autumn, but in no great numbers. Larvæ of *Cossus ligniperda* are very plentiful here. I have had dozens brought me by

children who pick them up in the road.—H. M. EDELSTEN, The Elms, Forty Hill, Enfield. *October 16th, 1899.*

Since August last I have found larvæ and imagines of both Macro- and Micro-Lepidoptera far from common. There have, however, been a few exceptions to the rule, e.g., *Catocala nupta* and *Ennomos angularia*, which have been unusually common on fences and tree-trunks, and larvæ of *Enicostoma lobella* and *Rhodophaea formosella* have occurred freely. Sugar and light have been useless. In this district, as appears to have been the case generally, *Stenopteryx noctuella* (*hybridalis*) has been a perfect nuisance.—B. A. BOWER, F.E.S., Langley, Eltham Road, Lee, S.E. *October 14th, 1899.*

Throughout September and October sugar and light were in this district practically useless, only the commonest species putting in an appearance, and very few of these. I have done little larva-beating, but what I did do produced only earwigs and an occasional *Rumia luteolata*. Storms destroyed the ivy bloom, of which there is not much within reach. Among the Lithocolletids and Nepticulids I have done better, mines of several species, especially *Lithocolletis sorbi*, *L. cavella*, *L. ulmifoliella*, *L. salicicolella*, *Nepticula septembrella*, *N. argentipedella*, being abundant. With the exception of a short period in July and the beginning of August, when sugar and light were fairly productive, the season has been an exceptionally bad one here.—(Rev.) C. D. ASH, Skipwith Rectory, Selby. *November 6th, 1899.*

On September 1st I took a fine female *Sphinx convolvuli* at rest, but have only heard of two others being taken here during the past autumn, so that it has evidently been a bad season for the species. *Acherontia atropos*, on the other hand, appears to have been common, for a couple have been brought to me, whilst another collector has had five or six brought from potato fields in the neighbourhood. *Macroglossa stellatarum* has also been very common; I found them about 12 noon, at rest on a stony bank with the sun shining on them. Comparatively few were taken hovering over flowers, the majority being captured whilst basking in the sun. I took one *Camptogramma fluviana* whilst getting pupæ of *Gortyna flavajo*. I bred a nice lot of the latter, losing only one by mould. Light has been no good, and ivy and sugar also useless, *Orrhodia vaccinii* only coming to the latter and *Anchocelis lunosa* and *A. pistacina* to the former. On September 13th I captured a female *Colias edusa*, the only one, I believe, observed in the neighbourhood.—(Major) R. B. ROBERTSON, Forest View, Southbourne Road, Boscombe. *November 8th, 1899.*

AVENTIA FLEXULA AT READING.—I had the pleasure of taking a fine specimen of *Aventia flexula*, on August 12th, at sugar, the first time I have taken that species here.—W. E. BUTLER, Hayling House, Reading.

SPREAD OF CERTAIN SPECIES OF LEPIDOPTERA.—Mr. Studd has mentioned the spread of *Callimorpha hera* in Devonshire, I can say the same of *Caradrina ambigua*. For the last few years it seems to have been taken very freely on the South Devon coast; during the last autumn one was taken on the heather of the uplands near here, and about 10 or 11 miles from the sea.—W. S. RIDING, M.D., F.E.S., Buckerell, E. Devon. *November 25th, 1899.*

AUTUMNAL EMERGENCE OF ACHERONTIA ATROPOS.—The *Acherontia atropos*, mentioned (*ante*, p. 306) as having pupated on August 27th, emerged on November 19th (indoors).—T. ASHTON LOFTHOUSE, The Croft, Linthorpe, Middlesborough. *December 1st, 1899.*

CURRENT NOTES.

In the November no. of *Psyche*, Scudder gives an account of the species of *Myrmecophila* occurring in the United States. Passing over the very doubtful note by Harris, these curious little crickets were first recorded by Bruner, in 1884, as occurring in North America. In this paper, Scudder includes five species, from very widely scattered localities.

A few pages further in the same journal, he compares the census of European and United States Orthoptera-Fauna. Europe is richer in earwigs, but is surpassed by the States in *Blattodea*, *Mantodea* and *Phasmatodea*, while of the *Acridiodea* we have only 148 species against their 531; although we have two *Pyrgomorphidae* and 34 *Pamphagidae* which are unrepresented in America, we are far outnumbered in the other groups. The United States appear to be poor in *Locustodea*, for we have the advantage in every group, except the *Stenopelmaticidae*, where they have 77 against our five. Several of our families in this group are not represented in America. In crickets, too, we are beaten, having 33 species against the American 64. Altogether our grand total is 471 species, while 856 are included on the American list. The author notes that his list of the European forms is entirely taken from Brunner's *Prodromus*; of course the great additions made since the appearance of this work would bring up the European total very considerably.

Scudder has just published a short paper on *Tropizaspis* and *Cacopteris*, two genera of American *Dectiidae*. The former genus was established by Brunner, without actually receiving any species, in his "Revision" in 1893. Scudder notices five species, of which four are new, and he includes in it the *Arytropteris steidnacheri*, Herman. Of *Cacopteris* he describes seven species, all new.

The Rev. F. D. Morice exhibited at the meeting of the Ent. Soc. of London, held on October 4th, three female specimens of *Exoneura libanensis*, Friese, taken at Brumana on Mount Lebanon, near Beirut; and, for comparison with them, he showed two specimens of *Ceratina cucurbitina*, Rossi, from Switzerland. He commented upon the remarkable distribution of the genus *Exoneura*, Smith, and said this genus has been hitherto recorded only from Australia. Mr. Gahan remarked upon the difficulty of accounting for the distribution of many genera of insects, and pointed out that the case brought under their notice by Mr. Morice was closely paralleled by that of the coleopterous genus *Pelobius*, of which two species were, so far, known only from Australia, while the third was almost entirely confined to Europe.

The second part of *Die Palaearktischen Grossschmetterlinge und ihre Naturgeschichte* (published by Ernst Heyne, Leipzig) has been issued. It contains the greater part of the species of the genus *Deilephila*, and those dealt with appear to be as carefully described and their life-histories worked out as fully as those in the preceding part.

As supplementary to his previous works on the *Mallophaga*, Professor Kellogg has now issued (Government Printing Office, Washington, U.S.A.) "A list of the *Mallophaga* taken from birds and mammals of North America." He gives also an account of the bibliography of the group, and a brief summary of the facts leading to the mode of classification adopted. He states that "the latest classification of insects assigns to the *Mallophaga* the position of an independent order.

The affinities of the order are, in general, with the platypterous pseudo-neuropteroid group, comprising the Termites, Psocids and Perlids and are, in particular, with the *Psocidae*."

At the meeting of the Entomological Society of London on November 15th, Mr. J. J. Walker exhibited a very interesting case of a coleopterous insect showing protective coloration according to locality. This was a series of *Cleonus sulcirostris*, L., from Barr's Hill near Oxford that had departed from the usual grey colour and was of a bright reddish tint, the same colour as the sand at that locality. In the box, for comparison, were other specimens from Deal and Reading that did not differ from the usual colour.

At the same meeting Mr. G. W. Kirkaldy exhibited two species of Hemiptera of economic interest, one a Pyrrhocorid—*Dysdercus cingulatus*, Fabr., sent by Mr. E. E. Green from Ceylon, where it was found appearing in abundance on the cotton plants, the other a Psyllid—*Aleyrodicus dugesii*, Cockl., forwarded by M. A. Dugès, who stated that it is attacking the white mulberries in Mexico.

Dr. C. G. Thomson, one of the Honorary Fellows of the Entomological Society of London, has recently died. This makes the second gap within a few weeks in the ranks of the list of Honorary Fellows.

At the meeting of the Entom. Soc. of London held on November 1st, 1899, Mr. McLachlan showed four examples of *Deilephila lineata*, taken by Mr. E. W. Hainworth, at Victor, Colorado, at an elevation of 9000ft., on July 23rd, 1899; also an ash-twigg which had been girdled by hornets, the observation of this curious fact having been made by Mr. W. C. Boyd, of Cheshunt, from whom he received the twig.

At the same meeting Dr. T. A. Chapman exhibited specimens of *Erebia flavofasciata* taken at Campolungo at an elevation of 7000ft. He stated that the species occurred only in those places where there was an outcrop of dolomitic strata belonging to the crystalline schists, and was not met with elsewhere at that elevation, nor was it to be found in association with the same strata at lower levels. Some rare plants occur in the locality, but he did not know whether any particular species of grass, which might serve as the food-plant, was restricted to the same area. Mr. H. J. Elwes also exhibited, and gave a brief account of, a collection of Lepidoptera made by Mrs. Nicholl and himself in Bulgaria, and in a part of that country which had not previously been visited by entomologists. *Lycaena eroides*, *L. anteros*, *L. zephyrus*, *Melitaea cynthia*, *Erebia gorge*, and a species which he believed to be *Coenonympha typhon*, were a few of several interesting forms to which he directed attention.

We understand from Dr. Chapman, who has examined Fletcher's original New Forest examples which Barrett described as *Fumea betulina*, that the specimens and cases belong to *Bacotia sepium*. The answer to our query, "What is the *Fumea betulina* of Barrett?" (*ante*, p. 211), therefore, is, that it is *Bacotia sepium*. Barrett, therefore, has twice described the latter species in his work (1) as *tabulella* (2) as *betulina*. The question now arises as to what is the *Fumea betulina* which Barrett mentions as being given to him by Machin (*Ent. Mo. Mag.*, xxx., p. 268)?

ERRATA.—Page 288, line 8, "varieties" should be "rarities;" p. 288, line 40, "hopping" should be "looping;" p. 289, line 15, "corona" should be "corolla;" p. 290, line 4, "seasonable" should be "seasonal."—W. S. RINDGE.

Page 291, line 7, for "*Thecla pruni*" read "*Thecla spini*."—H. R. BROWN.

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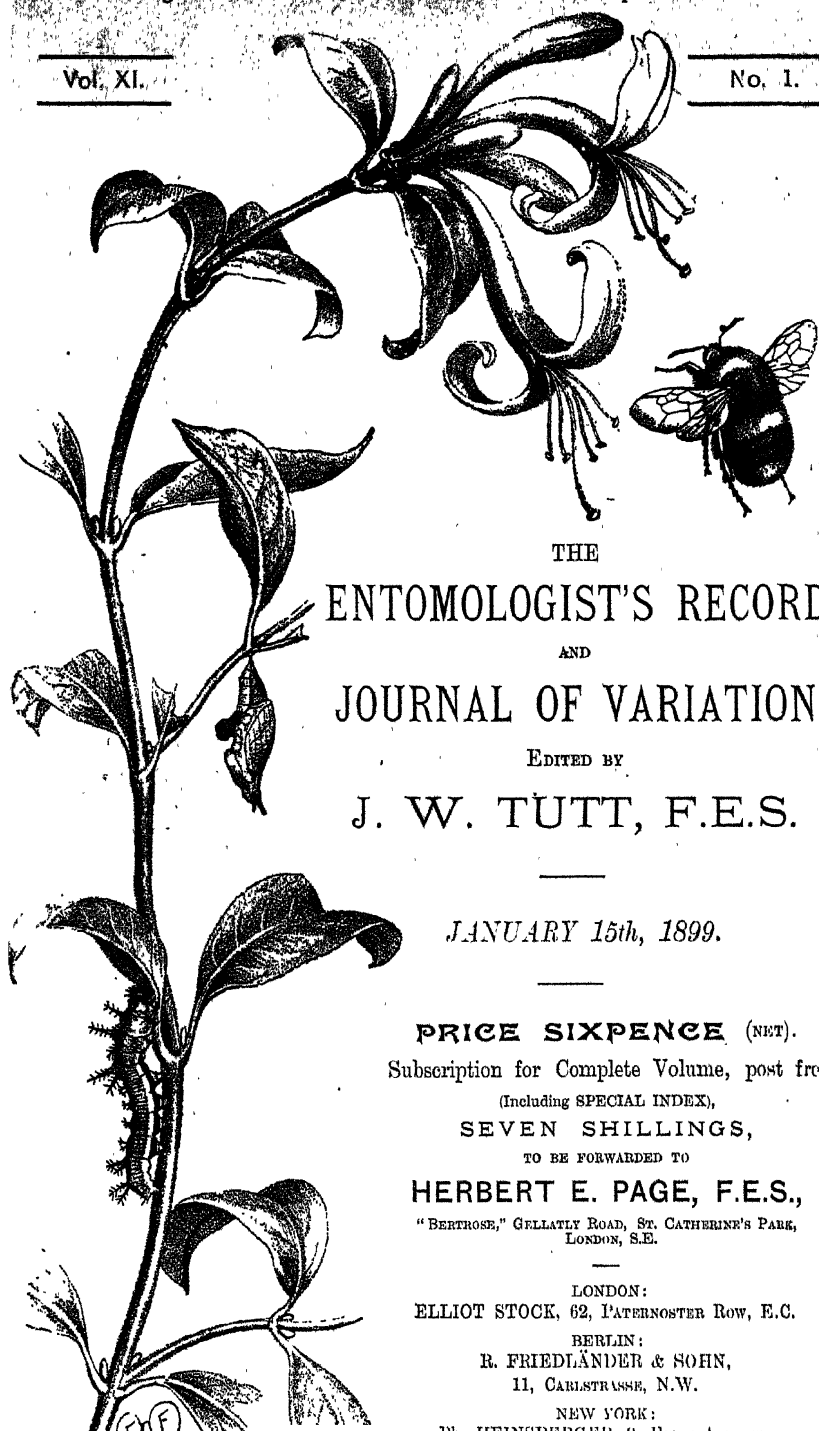
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Vol. XI.

No. 1.



THE
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[The Editor wishes to state that the publication of Exchanges, Advertisements, etc., in this Magazine, is in no way to be taken as a guarantee of the authenticity, good condition, &c., of the specimens. This notice is not intended to throw doubt upon the bona fides of Advertisers, etc., but to free the Editor from responsibility, should the privilege be abused.] *Marked* are bred. N.B.—Exchange Lists addressed to J. W. TUTT, Westcombe Hill, S.E., must be received before the 5th of each month for publication on the 15th.]

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The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m. Members are particularly requested to bring varieties and aberrations for exhibition. Non-members, cordially invited. Jan. 17th, Consideration of formation of a "Publication Fund." Feb. 7th, Paper on "Mollusca" by F. B. Jennings. Feb. 21st, "Notes on *Spilosoma lubricipeda*," by Mr. A. W. Mera.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. Jan. 26th, Annual Meeting (at 7 p.m.). Presidential Address by J. W. Tutt, F.E.S.

North London Natural History Society, Sigdon Road Board School, Dalston Lane, N.E. (near Hackney Downs Station). Meetings on the 1st and 3rd Thursdays in each month, from 7.45 (sharp) to 10 p.m.—*LAWRENCE J. TREMAYNE, Hon. Sec.*

Nonpareil Entomological Society, Mansfield Street, Kingsland.—The First and Third Thursdays in the Month.

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The SPECIAL INDEX for Vol. X. will be issued with the February number. Some little unavoidable delay has occurred in completing the Index to the Coleoptera.

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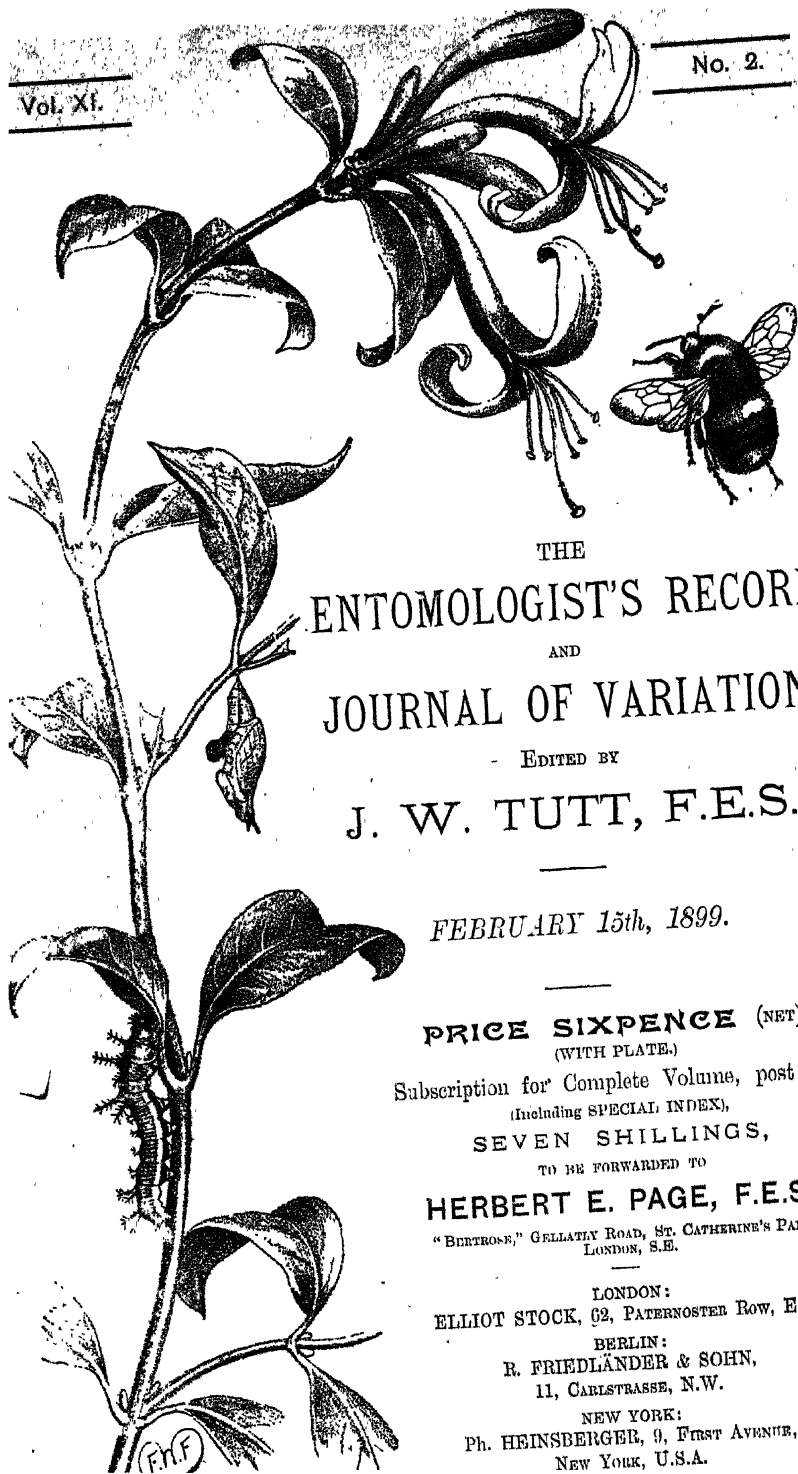
Yours faithfully,

Mr. H. E. PAGE, F.E.S.,

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Vol. XI.

No. 2.



THE
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J. W. TUTT, F.E.S.

FEBRUARY 15th, 1899.

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EXCHANGE.

[EXCHANGES, which should consist only of the specific names of Duplicates and Desiderata, are inserted for SUBSCRIBERS without charge so long as there is available space, but they MUST NOT be written on Post or Letter Cards, the inconvenience arising from which is very great. No exact limit is placed on the length of lists of Duplicates, but lists of Desiderata should be as short as possible. Entomological Books wanted may also be inserted in this column.]

[The Editor wishes to state that the publication of Exchanges, Advertisements, etc., in this Magazine, is in no way to be taken as a guarantee of the authenticity, good condition, &c., of the specimens. This notice is not intended to throw doubt upon the bona fides of Advertisers, etc., but to free the Editor from responsibility, should the privilege be abused.] *Marked are bred.* N.B.—Exchange Lists addressed to J. W. TUTT, Westcombe Hill, S.E., must be received before the 5th of each month for publication on the 15th.

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Entomological Society of London, 11, Chandos Street, Cavendish Square, W.—Wednesday, Feb. 15th, March 1st, March 15th, April 5th, May 3rd, and June 7th 1899, at 8 p.m.

The City of London Entomological and Natural History Society. — London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m. Members are particularly requested to bring varieties and aberrations for exhibition. Non-members cordially invited. Feb. 21st, "Notes on Spilosoma lubricipeda," by Mr. A. W. Mern.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m.

North London Natural History Society, Sigdon Road Board School, Dalston Lane, N.E. (close to Hackney Downs Station, G.E.R.).—Meetings first and third Thursdays in each month, at 7.45 p.m. Feb. 16th, "Notes on the Relation of Insects to Man," by A. Bacot. March 30, Debate, "Which Science is the better adapted for the elucidation of Biological Problems, Botany or Entomology?"

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VOL. I.

THE FIRST VOLUME contains the following preliminary chapters:—I. The Origin of the Lepidoptera. II. The Ovary. III. The Embryology of a Lepidopterous Insect. IV. Parthenogenesis in Lepidoptera. V. The External Structure of the Lepidopterous Larva. VI. The Internal Structure of the Lepidopterous Larva. VII. Variation of Imagines of Lepidoptera. VIII. Protective Coloration and Defensive Structures of Lepidopterous Larvæ. IX. Classification of the Lepidoptera.

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For the SYNONYMY the help of Lord Walsingham, Messrs. Durrant, Kirby and Prout has been obtained. The ORIGINAL DESCRIPTION is in the language in which it was written by the first describer of the species. The VARIATION of each species is dealt with from the broadest point of view, and a tabulation of all known forms given. For the EGG, LARVA, PUPA, etc., the help of Dr. Chapman, Mr. Bacot, and other specialists, has been obtained. The FOOD-PLANTS have been compiled from reliable British and Continental authors. The TIME OF APPEARANCE gives an accumulation of actual dates, spread over many years, and compiled from more than 200 lists, supplied by collectors in various parts of the country, besides every record the author has met with in British and Continental magazines. The LOCALITIES (British) are arranged in counties, each place having the name of the observer responsible for that place following it, in brackets. The DISTRIBUTION is not a mere translation of that in Standinger's *Catalog*, but has been compiled by taking the most authoritative lists for each country in which the species is found.

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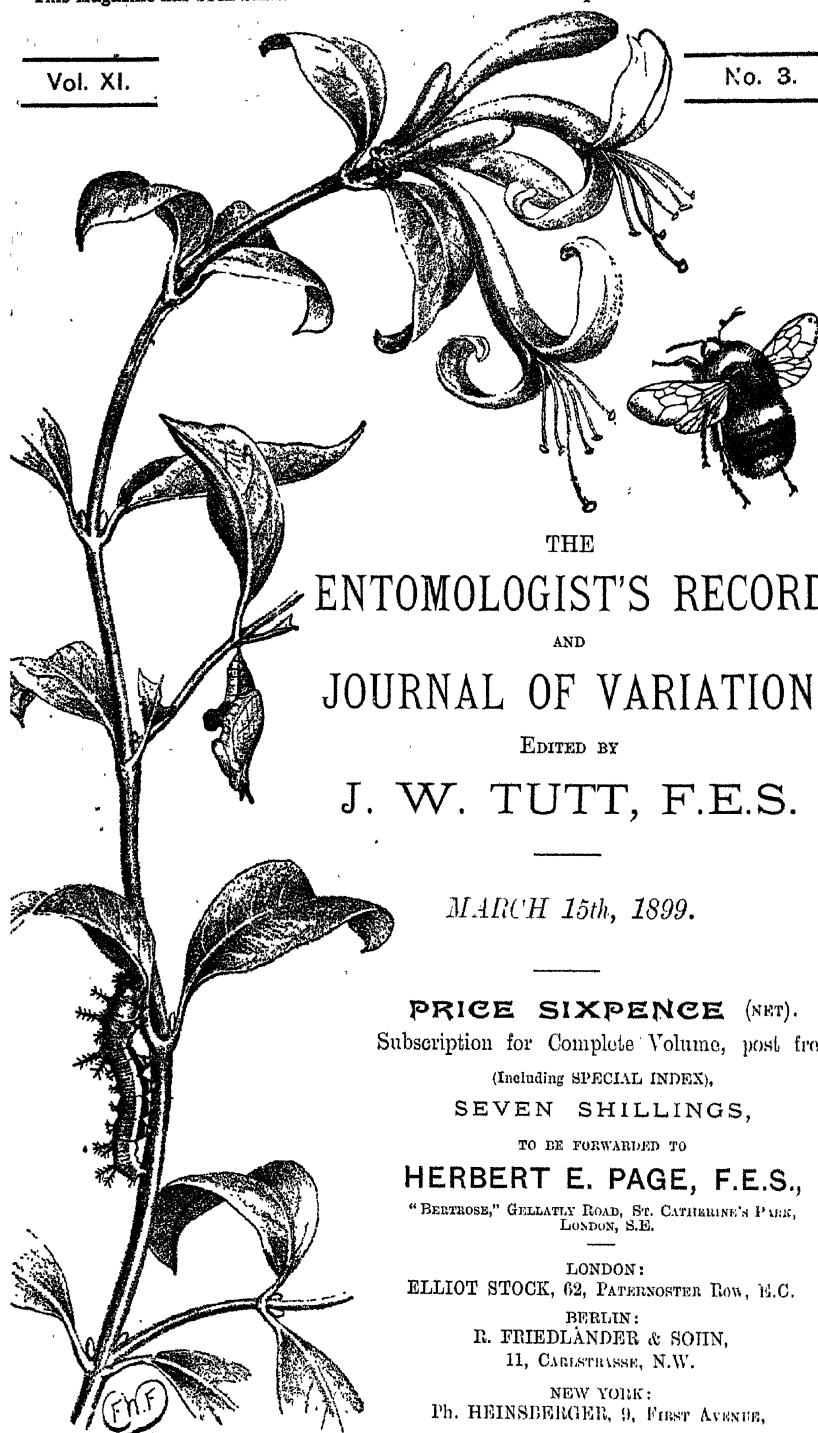
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Vol. XI.

No. 3.



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EXCHANGE.

EXCHANGES, which should consist only of the specific names of Duplicates and Desiderata, are inserted for SUBSCRIBERS without charge so long as there is available space, but they MUST NOT be written on Post or Letter Cards, the inconvenience arising from which is very great. No exact hunt is placed on the length of lists of Duplicates, but lists of Desiderata should be as short as possible. Entomological Books wanted may also be inserted in this column.]

[The Editor wishes to state that the publication of Exchanges, Advertisements, etc., in this Magazine, is in no way to be taken as a guarantee of the authenticity, good condition, &c., of the specimens. This notice is not intended to throw doubt upon the bona fides of Advertisers, etc., but to free the Editor from responsibility, should the privilege be abused.] Marked: *arch'd*. N.B.—Exchange Lists addressed to J. W. TUTT, Westcombe Hill, S.E., must be received before the 5th of each month for publication on the 15th.

NOTICE.—The Editor will be glad of eggs, larvæ and pupæ of Lepidoptera, for description. *S. pavonia* (eggs), common Spingids (eggs), Psychids, Solenobiids and Talaeporia (all stages), Pterophorids (all stages).

IMPORTANT.—Wanted, actual dates on which, and exact localities where, Psychids, Lasiocampids and Spingids have been captured.—J. W. TUTT, Westcombe Hill, S.E.

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LEPIDOPTERA OF THE CLYDESDALE DISTRICT.—Will entomologists who have visited the West of Scotland kindly send me a list of their captures, as I am compiling a list of the Lepidoptera of the district? The district comprises the whole of Lanarkshire, Renfrewshire, Ayrshire, and Dumbartonshire, part of Stirlingshire and Argyleshire, and the islands of Bute and Arran. The list is being compiled on account of the visit of the British Association to Glasgow, in 1901.—*A. Adie Dalglish, 21, Princes Street, Pollokshields, Glasgow.*

MEETINGS OF SOCIETIES.

Entomological Society of London, 11, Chandos Street, Cavendish Square, W.—Wednesday, March 15th, April 5th, May 3rd, and June 7th 1899, at 8 p.m.

The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m. Members are particularly requested to bring varieties and aberrations for exhibition. Non-members cordially invited. March 21st, "*Oporabia autumnata*," by Mr. L. B. Prout, F.E.S. April 4th, "Crossing of *Lasiocampa quereus* and its vars." April 18th. Paper by Mr. H. Donisthorpe relating to Coleoptera.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. March 23rd, "Orthoptera, with special reference to British species," Mr. Burr, F.E.S., F.Z.S. April 13th, Microscopical Meeting: "Freshwater Entomostraca," Mr. Scumfield, F.R.M.S. April 27th, Lantern Slides: "Insect Anatomy," Mr. F. Clark. May 11th, Lantern Lecture on "Mimicry and Protective Resemblance," Mr. J. W. Tutt. May 27th, Field Meeting at Chatham under the guidance of Mr. Walker, R.N., F.E.S. June 10th, Field Meeting at Byfleet. July 15th, Field Meeting at Wisley, via Effingham. Field Meetings may also be arranged to Worley Scrubbs and to the New Forest at Whitsuntide, if members so desire.

North London Natural History Society, Sigston Road Board School, Dalston Lane N.E. (close to Hackney Downs Station, G.E.R.).—Meetings first and third Thursdays in each month, at 7.45 p.m. March 30, Debate, "Which Science is the better adapted for the elucidation of Biological Problems, Botany or Entomology?"

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VOL. I.

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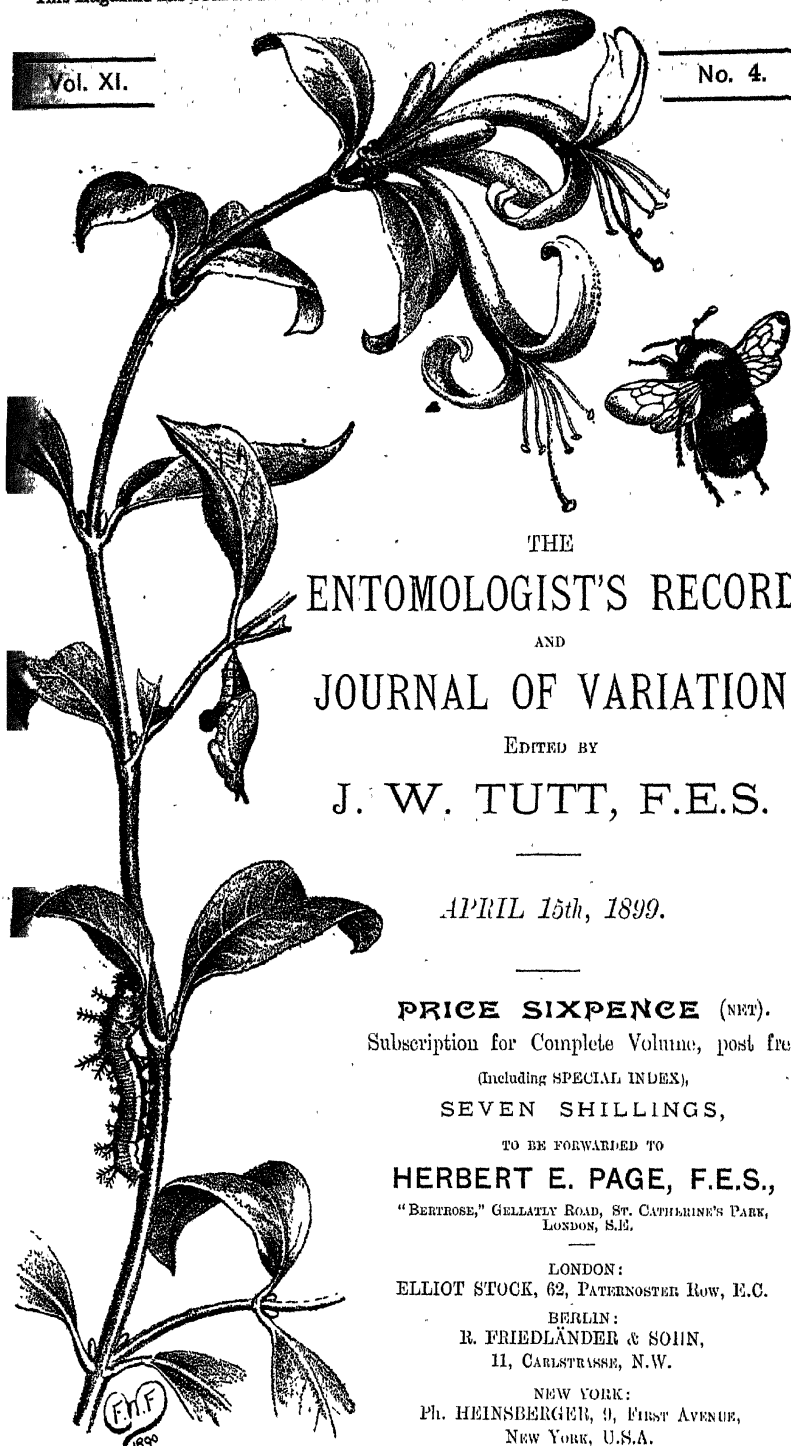
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Vol. XI.

No. 4.



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EXCHANGE.

EXCHANGES, which should consist only of the specific names of Duplicates and Desiderata, are inserted for SUBSCRIBERS without charge so long as there is available space, but they MUST NOT be written on Post or Letter Cards, the inconvenience arising from which is very great. No exact limit is placed on the length of lists of Duplicates, but lists of Desiderata should be as short as possible. Entomological Books wanted may also be inserted in this column.]

[The Editor wishes to state that the publication of Exchanges, Advertisements, etc., in this Magazine, is in no way to be taken as a guarantee of the authenticity, good condition, &c., of the specimens. This notice is not intended to throw doubt upon the *bona fides* of Advertisers, etc., but to free the Editor from responsibility, should the privilege be abused.] *Marked' are bred.* N.B.—Exchange Lists addressed to J. W. TUTT, Westcombe Hill, S.E., must be received before the 5th of each month for publication on the 15th.

NOTICE.—The Editor will be glad of eggs, larvæ and pupæ of Lepidoptera, for description. *S. pavonia* (eggs), common Spingids (eggs), Psychids, Solenobiids and Talaeporia (all stages), Pterophorids (all stages).

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LEPIDOPTERA OF THE CLYDESDALE DISTRICT.—Will entomologists who have visited the West of Scotland kindly send me a list of their captures, as I am compiling a list of the Lepidoptera of the district? The district comprises the whole of Lanarkshire, Renfrewshire, Ayrshire, and Dumbartonshire, part of Stirlingshire and Argyllshire, and the islands of Bute and Arran. The list is being compiled on account of the visit of the British Association to Glasgow, in 1901.—*A. Adie Inglis, 21, Princes Street, Pollok-shields, Glasgow.*

CHANGES OF ADDRESS.—*H. Mousley, to 10, Selborne Terrace, Manningham, Bradford*; *Major Robertson, to Forest View, Southborne Road, Boscombe, Hants.*; *C. W. Watts, to Basted Cottage, Boro' Green, Kent*; *L. Newman, to 18, Salisbury Road, Bexley, Kent.*

MEETINGS OF SOCIETIES.

Entomological Society of London, 11, Chandos Street, Cavendish Square, W.—Wednesday, May 3rd, and June 7th 1899, at 8 p.m.

The City of London Entomological and Natural History Society.—London Institution, Finsbury Circus, E.C.—The first and third Tuesdays in the month, at 7.30 p.m. Members are particularly requested to bring varieties and aberrations for exhibition. Non-members cordially invited. April 18th, Paper by Mr. H. Donisthorpe relating to Coleoptera.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—The second and fourth Thursdays in each month, at 8 p.m. April 13th, Microscopical Meeting: "Freshwater Entomostraca," Mr. Scourfield, F.R.M.S. April 27th, Lantern Slides: "Insect Anatomy," Mr. F. Clark. May 11th, Lantern Lecture on "Mimicry and Protective Resemblance," Mr. J. W. Tutt. May 27th, Field Meeting at Chatham under the guidance of Mr. Walker, R.N., F.R.S. June 10th, Field Meeting at Byfleet. July 15th, Field Meeting at Wisley, via Egham. Field Meetings may also be arranged to Worley Scrubs and to the New Forest at Whitsuntide, if members so desire.

North London Natural History Society, Sigdon Road Board School, Dalston Lane, N.E. (close to Hackney Downs Station, G.E.R.).—Meetings first and third Thursdays in each month, at 7.15 p.m.

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